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PAPER TRADE JOURNAL

Reg. U. S. Pat. Off.

Vol. CIII OCTOBER 29, 1936 No. 18

1886—1936

Experience

Truly has it been stated, "Experience is the cornerstone of judgment," and it might be added that extended experience provides the foundation.

Surely, it is worth while to counsel and consult with an organization that has shown initiative, resourcefulness and dependability for fifty years and that is as soundly progressive in 1936 as it was in 1886.

GOTTESMAN & COMPANY

—INCORPORATED—

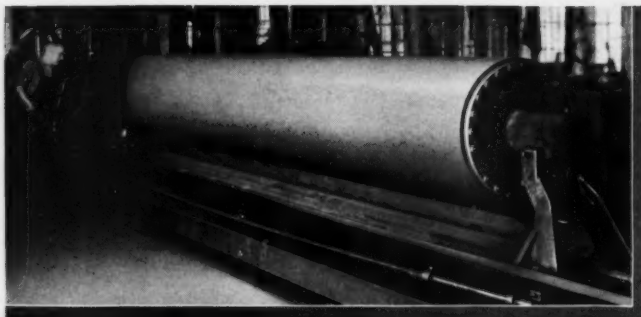
WOOD PULP

Of Every Description

22 EAST 40th STREET NEW YORK, N. Y.

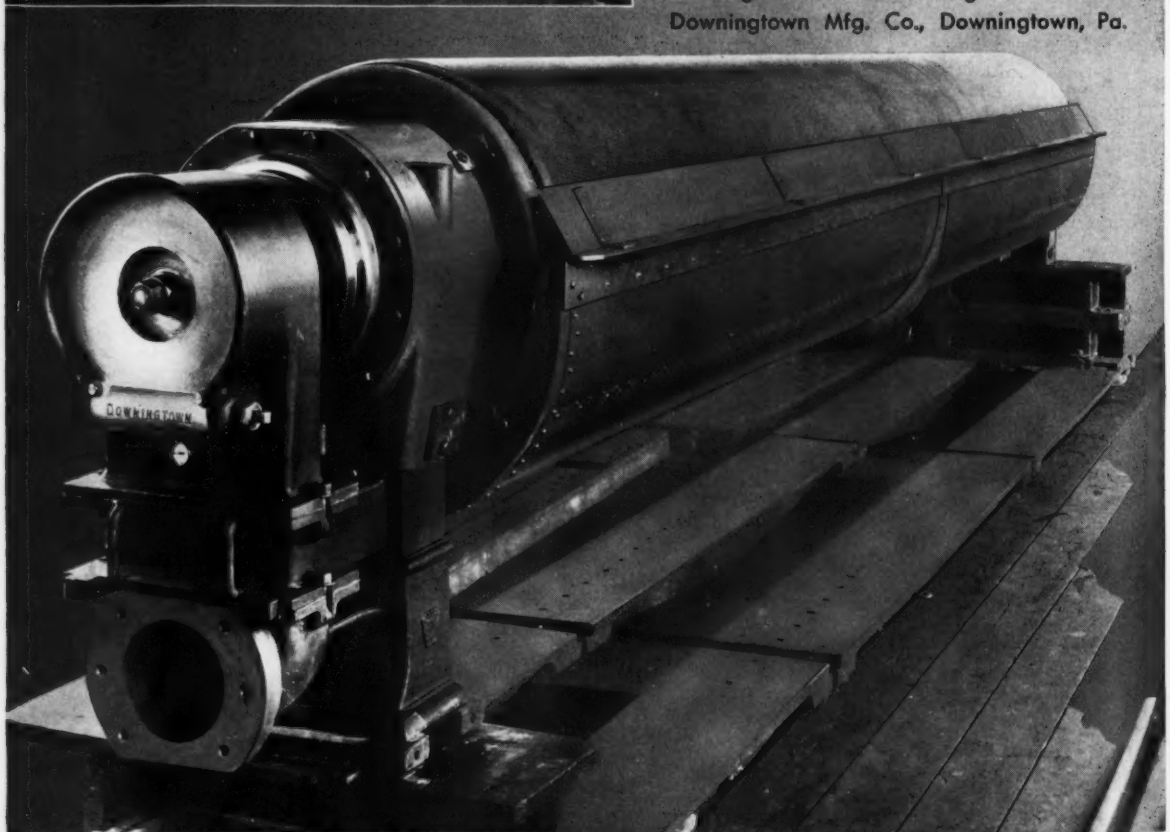
EUROPEAN OFFICES: Birger Jarlsgatan 8, Stockholm, Sweden

DOWNINGTOWN



MAMMOTH OR MIDGET SUCTION ROLLS

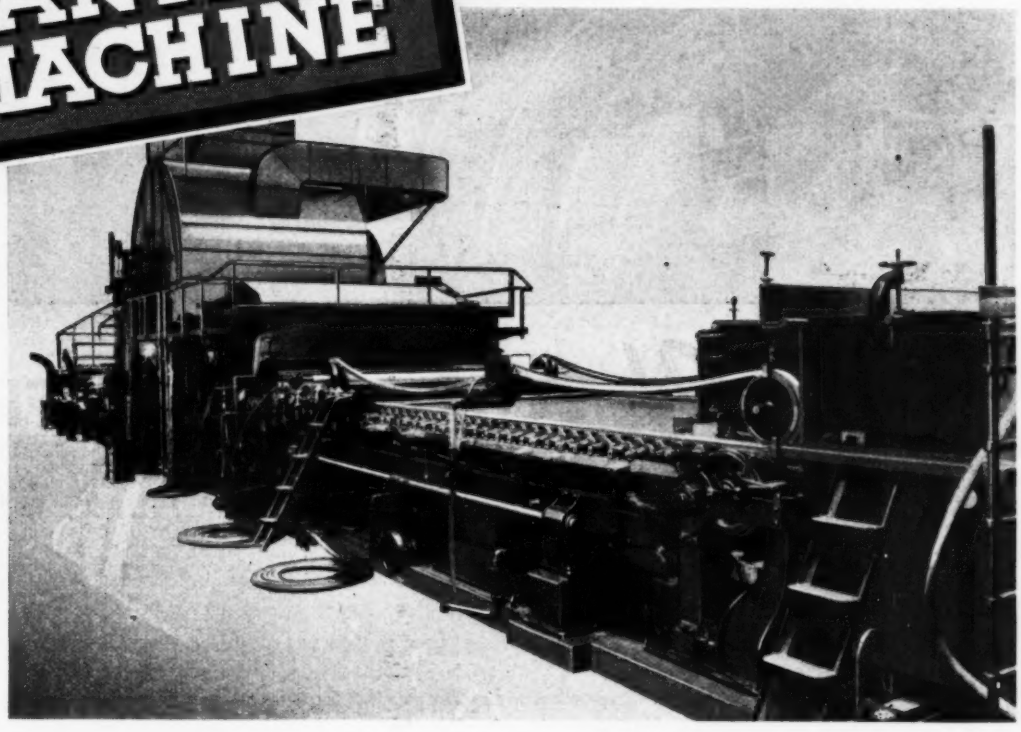
No machine is "too wide" or "too narrow" for Downingtown Suction Couch, Press, Drum and Felt Cleaning Rolls. Their construction and operating superiorities are identical, regardless of the size of the roll. A giant rubber covered suction press for high speed book paper fourdrinier is shown below. Photos on the left were taken in our shops while this huge roll was being built, the top picture showing the shell being ground and the bottom picture showing the suction box being machined. The Downingtown Mfg. Co., Downingtown, Pa.



OLDEST MANUFACTURER OF *MODERN* SUCTION ROLLS

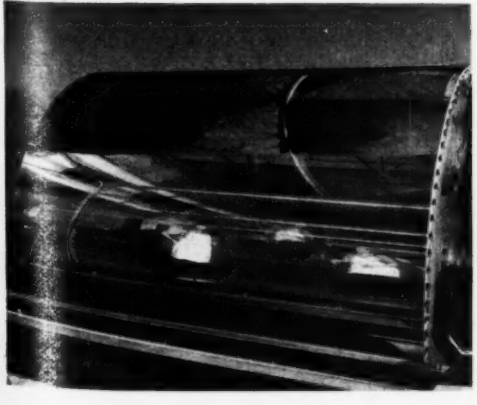
Entered as second class matter at the Post Office at East Stroudsburg, Pa., under the Act of Congress of March 3, 1879. Published every Thursday by the Lockwood Trade Journal Co., at 34 N. Crystal St., East Stroudsburg, Pa. Executive and Editorial offices: 15 W. 47th St., New York, N. Y. Domestic subscription U. S. and possessions, $4.00 per year.

THE Beloit YANKEE MACHINE



● The Beloit Yankee Machine furnishes an economical easy means of diversification. No other machine has the all-around adaptability to fit the needs of mills making specialty papers, both light and heavy weights.

The machine is provided with all the latest features: Removable Fourdrinier ...High Speed Super Shake...Suction Rolls...High Pressure Dryer...Hypoid Drive, etc.

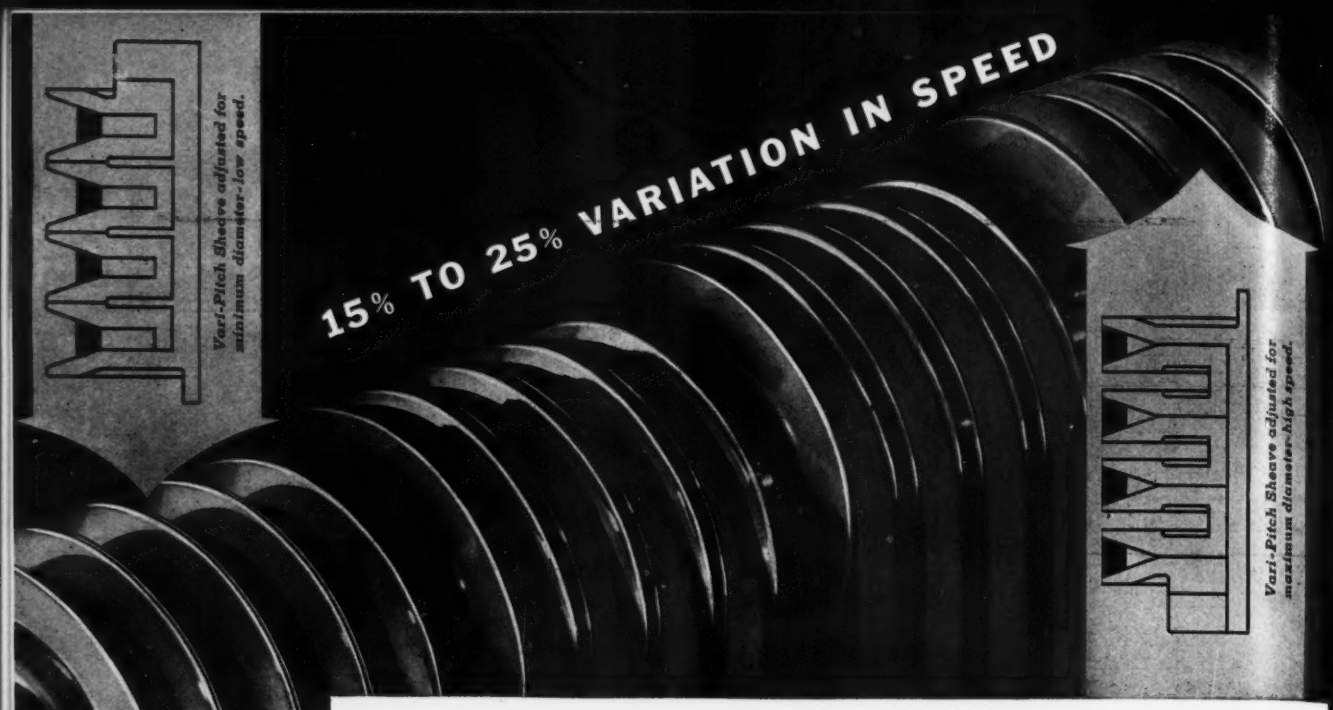


Beloit has developed a special alloy metal and special grinding and polishing process to produce the close grained, hard mirror finish shown in this photograph. This is a result of Beloit's many years of experience in building practically all the Yankee machines in this country.

Beloit has also recently developed a high pressure Yankee dryer to meet the demand for maximum production.

THE BELOIT WAY IS THE MODERN WAY

BELOIT IRON WORKS • BELOIT · WIS.

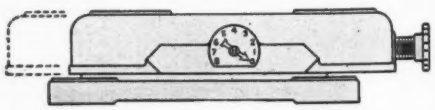

SLOW
Vari-Pitch Sheave adjusted for minimum diameter-low speed.
15% TO 25% VARIATION IN SPEED
FAST
Vari-Pitch Sheave adjusted for maximum diameter-high speed.

If YOU ARE INDIFFERENT to efficiency... *then* this page will not interest you

Competition is such today, that profits, in most cases, depend on the difference between approximate efficiency and high efficiency.

It is this fact that makes the new Vari-Pitch Sheave, for Texrope V-Belt Drives, of the most vital importance in the power transmission field. By a simple adjustment that takes but a moment, the diameter of the Vari-Pitch Sheave may be altered to a degree which will give a variation in speed from 15 to 25% per sheave. That means that you can experiment through a long range of fractionally increased or decreased diameters to ascertain at just what speed your machinery shows the highest possible efficiency; it also means that you can make different products on the same machine, some of which may require higher speed and some lower—and all this can be done without dismantling and buying new drives, but simply by taking a few moments to make the desired adjustment.

Vari-Pitch Texrope Sheaves are made for stationary and motion control.



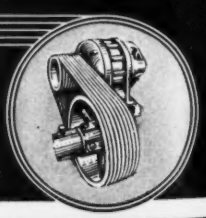
Straitline Automatic Ball Bearing Motor Base developed for the Motion Control Vari-Pitch Sheave. You simply turn the hand-wheel to alter the diameter of the sheave and simultaneously the base moves forward or backward to maintain the proper belt tension.

Write for Vari-Pitch Bulletin No. 1261

Belts by Goodrich

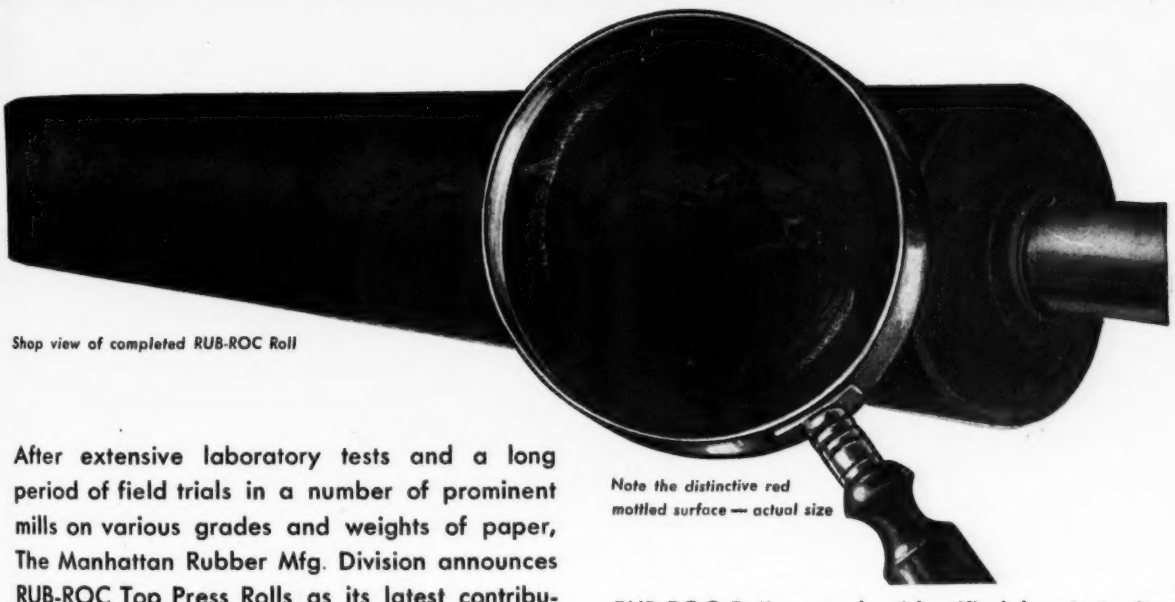
TEXROPE DIVISION

ALLIS-CHALMERS



MILWAUKEE WISCONSIN

Announcing RUB-ROC TOP PRESS ROLLS MADE BY MANHATTAN



Shop view of completed RUB-ROC Roll

Note the distinctive red mottled surface — actual size

After extensive laboratory tests and a long period of field trials in a number of prominent mills on various grades and weights of paper, The Manhattan Rubber Mfg. Division announces RUB-ROC Top Press Rolls as its latest contribution to better paper making.

This new RUB-ROC Roll is ideal for top press and smoothing press service. Because of the low adhesion of paper to the repellant surface, the sheet releases instantly. With RUB-ROC Rolls, felt wear is decreased and crushing of the sheet is eliminated—distinct advantages over rolls made of granite, gun-metal or wood.

RUB-ROC Rolls may be identified by their distinctive mottled surface. *They are guaranteed not to pick-up or crack in service.*

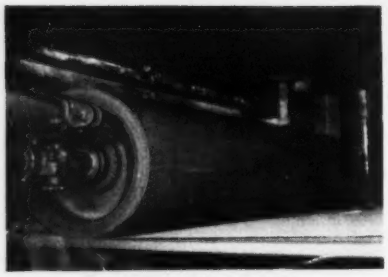
Why not try a RUB-ROC Roll on your next installation and let it prove its value from the standpoint of uniformity of quality and increased production?

Write our Roll Department for further information.

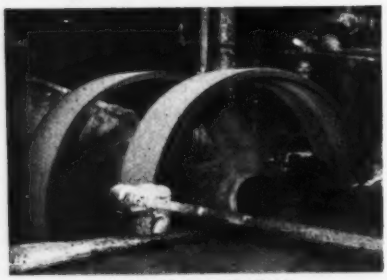
Manhattan Rolls also made in Fox River Valley Factory at Neenah, Wisconsin

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.

EXECUTIVE OFFICES and FACTORIES, 59 TOWNSEND ST., PASSAIC, N. J.

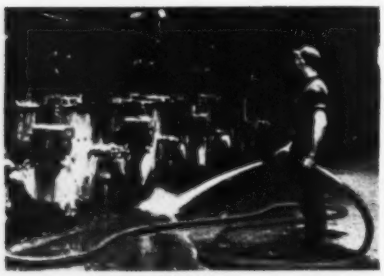


RUBBER ROLL COVERS



TRANSMISSION BELTING

CONVEYOR BELTING



HOSE

You're sure about service . . . about performance . . . about ultimate economy . . . about adaptability of product to job when you buy Cincinnati Conveyor Belting, Transmission Belting, Paper Mill Roll Covers, or Wash-up Hose.

Paper mills that have used Cincinnati rubber products know that ordering CINCINNATI is equivalent to writing dependability and economical service into the specifications. They know from experience that these products are well suited to meet the steady demands of production.

Cincinnati products are the record makers . . . they can be depended upon to come through. If you're not numbered among Cincinnati users . . . help yourself to an extra measure of satisfaction on your next requirement . . . order CINCINNATI.

THE CINCINNATI RUBBER MFG. CO.

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DETROIT - 317 Curtis Bldg.
CHICAGO - 43 E. Ohio St.
BUFFALO - 37-41 Carroll St.

CINCINNATI

CONVEYOR BELTS • TRANSMISSION BELTS
RUBBER ROLL COVERS • HOSE

HAMMERMILL...

One of the 5 Verigraphs installed at the Hammermill Paper Company

. . . is doing it with

VERIGRAPHS

Here's what this producer has to say:—"Hammermill has a Verigraph on each of its five paper machines, and finds that with the Verigraph a higher and more uniform moisture is obtained. For this reason a more uniform finish. Verigraph control is more accurate and dependable than hand control."

Hammermill is one of the 57 paper mills that have installed and are using more than 90 Verigraphs. Users know that the Verigraph enables them to make paper of any required moisture balance. They can produce more uniform finishes . . . a more uniformly dried sheet . . . and can carry higher moistures in their sheets. We will gladly give you complete information.

FOXBORO
REG. U. S. PAT. OFF.

THE FOXBORO COMPANY, 114 NEPONSET AVE., FOXBORO, MASS., U. S. A.

COMPLETE PULP AND PAPER MILL INSTRUMENTATION

APPLETON FELTS

The Symbol OF QUALITY AND SERVICE

For nearly half a century all our manufacturing efforts have been directed toward quality and service.

Every step in manufacturing is technically controlled from the selection of the raw wool to the finished felt—checked and rechecked to make the best felts possible.

Let us tell you what this means in your mill.

APPLETON WOOLEN MILLS

Appleton Wisconsin

PULP and PAPER...tireless founts of new miracles

A newly developed molding plastic made with paper pulp is the source of thousands of beautiful articles . . . radio cabinets, clocks, cigar-lighters, cocktail shakers, breakfast sets, pens and pencils, razors, etc.

Kraft paper that is really white! The result of a new accomplishment in the science of paper bleaching.

Paper progress is redesigning modern interiors. Brilliant brocade-like fabrics for drapes, and handsome rugs are being made from paper pulp.

An amazing new fabric made from paper pulp imparts novel charm to milady's costume. Stylists enthusiastically endorse the chic gloves, hats, handbags, shoes, belts that are being made from it.

Writing Paper: Today's writing paper sets new standards of excellence. It is smooth in finish, quick drying, and with no "pick-up" to hinder writing or mar the sheet.

SOLVAY

TRADE MARK REG. U. S. PAT. OFF.

...the paper manufacturer's co-worker in progress

The steadily increasing use of SOLVAY Soda Ash, Liquid Chlorine and Caustic Soda by paper makers—as well as the notable work of Solvay Technical Service in helping develop better pulp and paper products—is evidence of Solvay's importance in the new achievements of this industry. For quality products and quality results, specify SOLVAY.

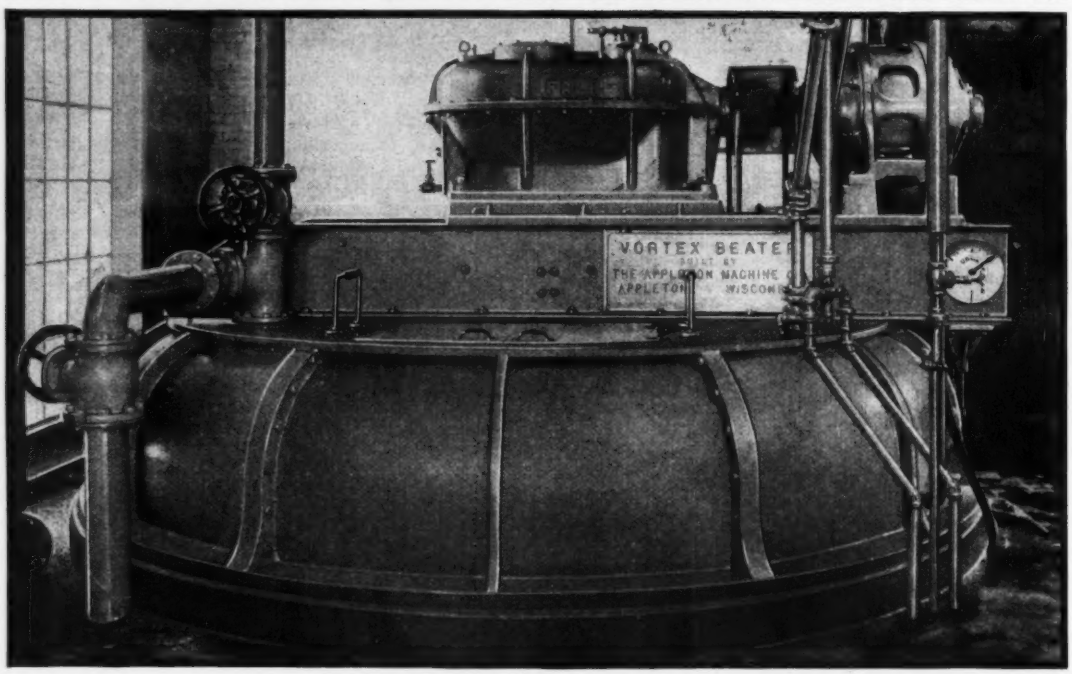
CAUSTIC SODA • SALT
CAUSTICIZED ASH
AMMONIUM CHLORIDE
PARA-DICHLOROBENZENE • CHLORINE • MODIFIED SODAS
AMMONIUM BICARBONATE • SODIUM NITRITE • SODA ASH

CALCIUM CHLORIDE
CAUSTIC POTASH
POTASSIUM CARBONATE

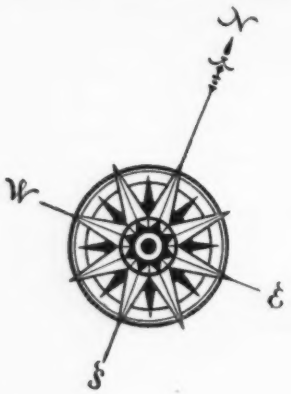
SOLVAY SALES CORPORATION • *Alkalies and Chemical Products Manufactured by The Solvay Process Company* • **40 RECTOR STREET, NEW YORK**

Branch Sales Offices: Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Indianapolis, Kansas City, New Orleans, New York, Philadelphia Pittsburgh, St. Louis, Syracuse

So you are going to England



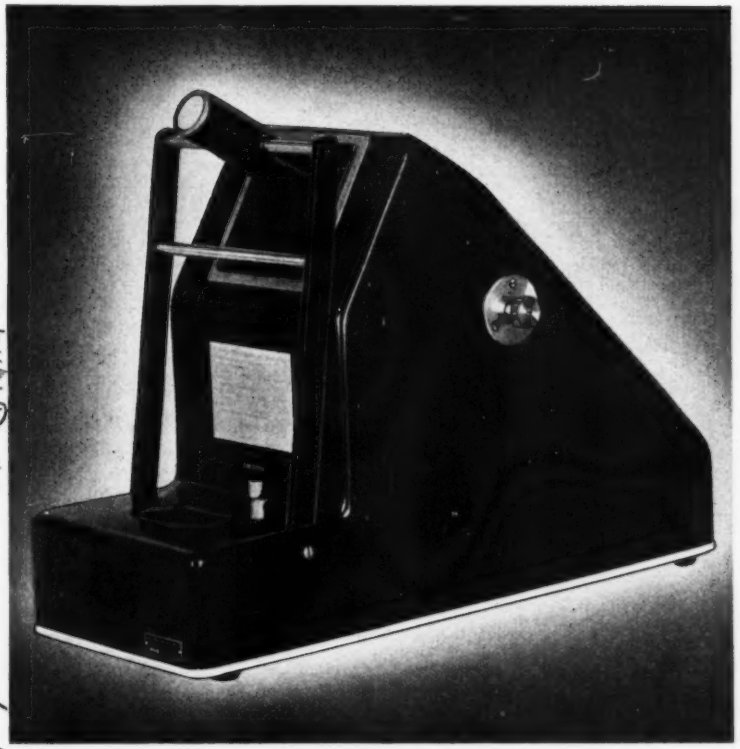
APPLETON VORTEX BEATER



Wherever the manufacture of paper is a modern industry, the announcement of the Appleton Vortex Beater has been received with more than passing interest. Here was an entirely different, rapid beating engine that prepared stock in less time, with less power, in greater volume and at lower cost. Inquiries have come from paper making countries all over the world. Representatives of foreign mills have investigated. Now the Appleton Vortex Beater is going to England.

The Appleton Vortex Beater invites a thorough examination and comparison of its performance and advantages. It combines to a remarkable extent all the features that promote efficient operation and control in the proper preparation of stock required to produce good paper.

THE APPLETON MACHINE COMPANY
• APPLETON • WISCONSIN •



Opacity CAN MAKE OR LOSE A SALE

Time and again — uniform opacity is the determining factor which influences paper buyers to decide on one paper rather than another. You can readily avoid variations and insure uniform opacity in your product by using a B & L Opacimeter

This instrument is designed expressly for the paper industry. It will enable you to accurately measure paper opacity in terms of contrast ratio and printing opacity.

The B & L Opacimeter gives greater accuracy than does the visual method. It accommodates samples of any size, shape or color and the accuracy remains the same regardless of the degree of opacity.

For complete details write to

Bausch & Lomb

627 St. Paul Street, Rochester, N. Y.

Bausch & Lomb Optical Co.,
627 St. Paul St.,
Rochester, N. Y.

Please send me catalog D-209 containing complete details on the B & L Opacimeter.

Name .....

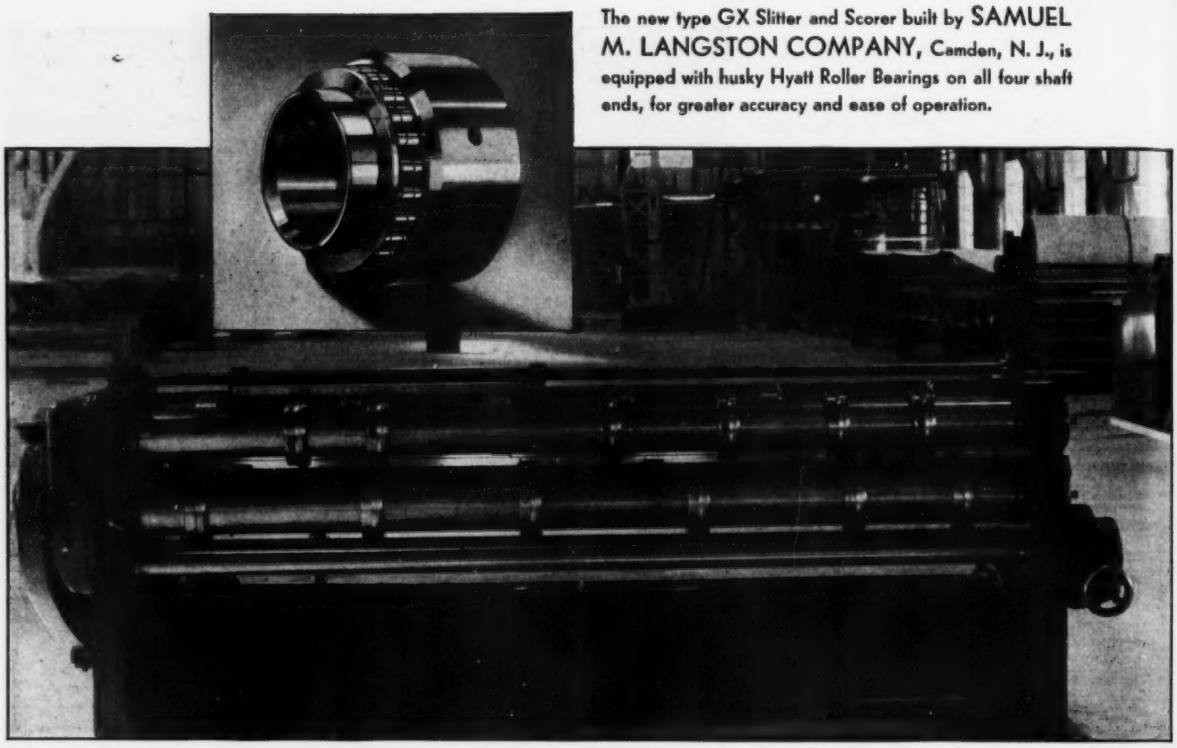
Company .....

Address .....

Title .....

WE MAKE OUR OWN GLASS TO INSURE STANDARDIZED PRODUCTION

FOR YOUR GLASSES, INSIST ON B & L ORTHOGON LENSES AND B & L FRAMES



The new type GX Slitter and Scorer built by SAMUEL M. LANGSTON COMPANY, Camden, N. J., is equipped with husky Hyatt Roller Bearings on all four shaft ends, for greater accuracy and ease of operation.

Specify HYATTS *by name for your equipment*

When your equipment is Hyatt-protected, you don't have to worry about bearing troubles, or power losses. Hyatts assure longer equipment life with minimum of power consumption and maintenance.

That's why Hyatt Roller Bearings are so widely used in all types of machinery and the equipment which helps produce it.

Most equipment builders standardize on Hyatt, but to play safe, it pays to specify Hyatts by name on your purchases. Hyatt Roller Bearing Company, Newark, Detroit, Chicago, Pittsburgh, San Francisco.

H Y A T T

ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

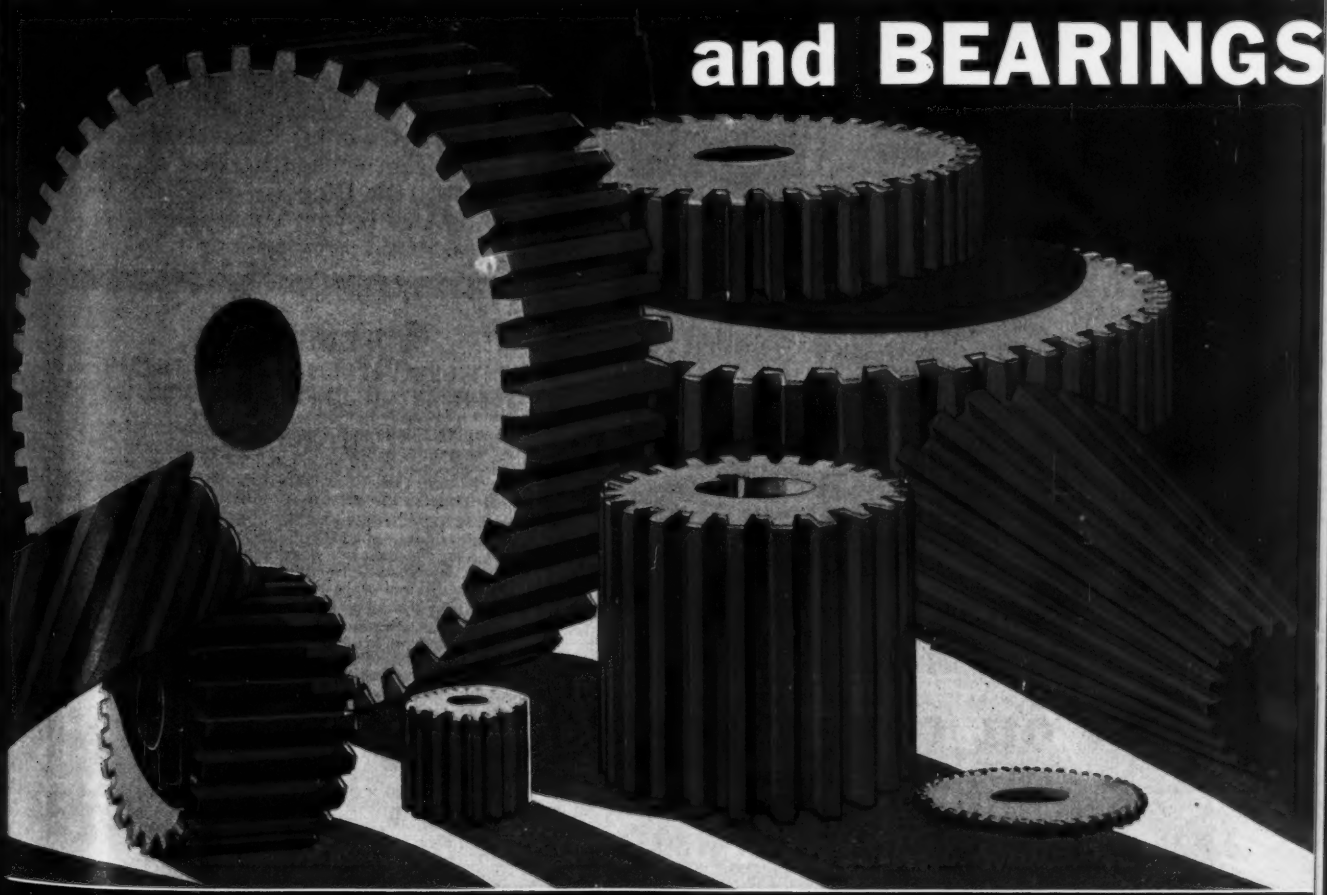
MODERN mills depend on INSUROK Gears and Bearings to improve paper-mill performance, to give steady, continuous, trouble-free service on all heavy driving equipment.

INSUROK Gears are long-lived; withstand the abuse of high speeds, neglect and overload. Silent . . . they eliminate noisy back drives, overcome screech and howl, and improve working conditions.

INSUROK Bearings (oilless) are tough, durable, friction-resisting, accurate. Impervious to the action of most liquids, acids, solvents and reagents, they may be lubricated with water only . . . in some instances they require no lubrication whatever. They are unaffected by sudden temperature changes, and possess a degree of resilience that withstands crushing loads.

Dependable, wear-and-time-resisting INSUROK has been adapted to a wide variety of uses in the paper mill, including Gears and Bearings; Toe Blocks; Doctor Blades; Suction-Box Covers; Cutting and Creasing Dies; Felt Whipper Bars; Valve Discs; Shake Springs; Felt Conditioner Plates; Save-All Pans; Sluice Boards for Cylinder Machines, and many others. Details on request.

INSUROK SILENT GEARS and BEARINGS

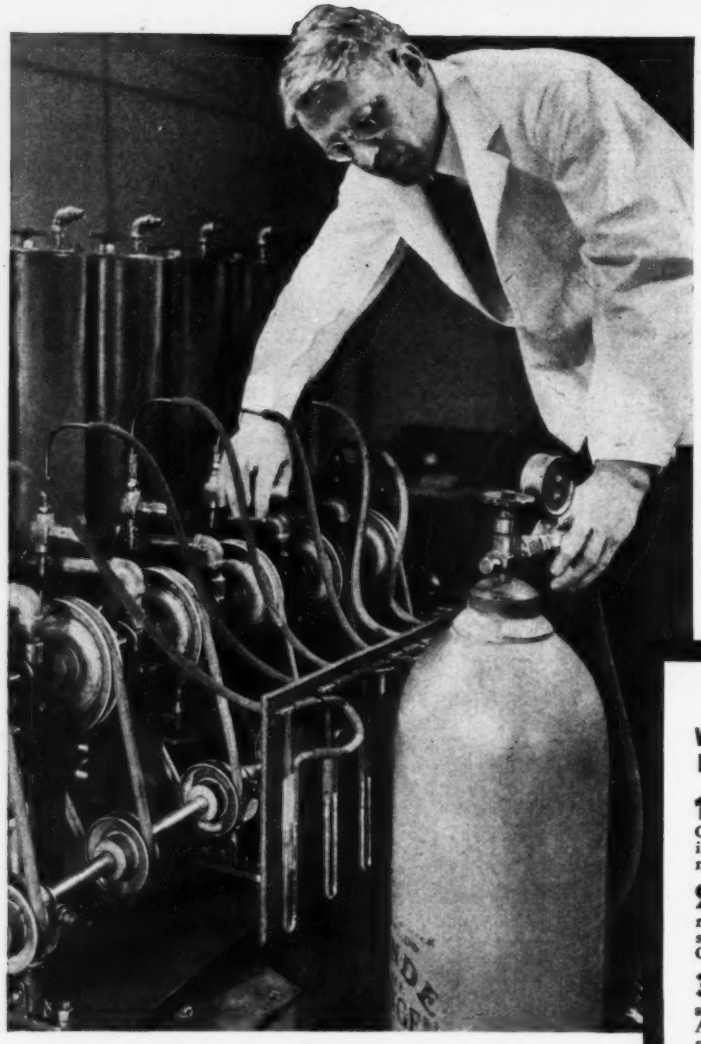


The RICHARDSON COMPANY

Melrose Park, (Chicago) Ill. Founded 1858 Lockland, (Cincinnati) Ohio
New Brunswick, N. J. Indianapolis, Ind.
FORMERLY, The RICHARDSON PAPER COMPANY
Detroit Office: 4-252 G. M. Building, Phone Madison 9386
New York Office: 75 West Street, Phone Whitehall 4-4487

STABILITY *Proved!*

Gulfcrest Oil shows greater resistance to oxidation than any turbine lubricant tested



"100 TIMES as severe as actual service in a turbine" that is the kind of treatment this laboratory apparatus has given to scores of different turbine oils. The oil, mixed with water, is circulated rapidly with a stream of oxygen whipped thoroughly into it. Periodically an inspection for sludge and emulsification is made. No other oil has shown stability equal to Gulfcrest Oil!

From scores of power plants come reports of the unparalleled performance of Gulfcrest Oil. This turbine lubricant—made by Gulf's exclusive ALCHLOR Process—will demonstrate its value in your equipment.

4 REASONS . . .
WHY GULFCREST OIL IS THE TURBINE LUBRICANT OF UNPARALLELED QUALITY

1 REFINED BY THE ALCHLOR PROCESS. This famous process, patented and owned exclusively by Gulf, is the most thorough and effective method for removing chemically active hydrocarbons as well as the general run of impurities present in all crudes.

2 HIGHEST RESISTANCE TO OXIDATION. Because this famous ALCHLOR Process synthesizes and rearranges the molecular structure of certain hydrocarbons, resulting in a finished product of greater stability, GULFCREST OIL stands alone in its high resistance to oxidation.

3 HIGHEST RESISTANCE TO ACIDITY AND SLUDGE. Because of the elimination of oxidation catalysts in addition to the unparalleled refining power of the Alchlor Process, these oils form less gum and deposits, less emulsion and sludge, when mixed with water over a period of several years continuous operation, than any other turbine oil of which we have record.

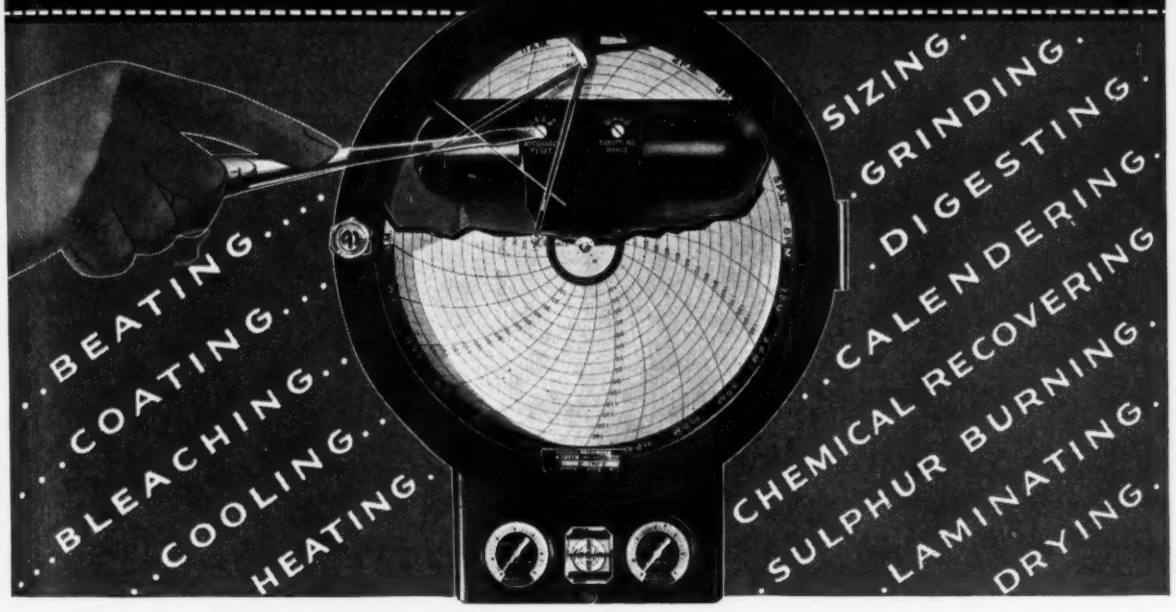
4 HIGHEST KILOWATT-HOUR PERFORMANCE. Because Alchlor not only makes possible an oil more thoroughly refined and homogeneous but also creates antioxidants, these oils have great resistance to deteriorating influences and are longer lived. Less makeup oil is required.

GULF OIL CORPORATION
GULF REFINING COMPANY
GENERAL OFFICES: GULF BLDG., PITTSBURGH, PA.

GULF INDUSTRIAL LUBRICATION

BROWN Air-O-Line

Simplifies TEMPERATURE CONTROL



"Tuning In" Gives Greater Accuracy

In the manufacture of paper, where temperature plays a vital part in production—you can't "temporize" with temperature.

Modern production methods demand that temperature be kept "on the mark"—when fluctuations either high or low mean a loss.

Brown Air-O-Line Thermometer Controllers can be "tuned in" to process control as easily as dialing a radio. This simplicity not only gives you greater accuracy, but outstanding performance. The use of Graduated Dials for both "Throttling Range and Automatic Reset" are revolutionary developments in air-operated controllers. They encourage process operators to seek the "best possible" in control—by putting the "best possible" within reach.

A slight turn of the screw-driver enables the operator to accurately "tune in" to specific temperature control requirements without "guesswork" or taking the instrument off control.

Air-O-Line not only simplifies temperature control, but it "Recognizes," "Analyzes," and "Corrects" for any departure from the desired control point, without "hunting" "cycling," "drifting" or "shifting" of the control setting.

To put Air-O-Line in operation, all that is necessary is to set the control index at the desired point, "tune in" Throttling Range and Automatic Reset—Air-O-Line then becomes fully automatic.

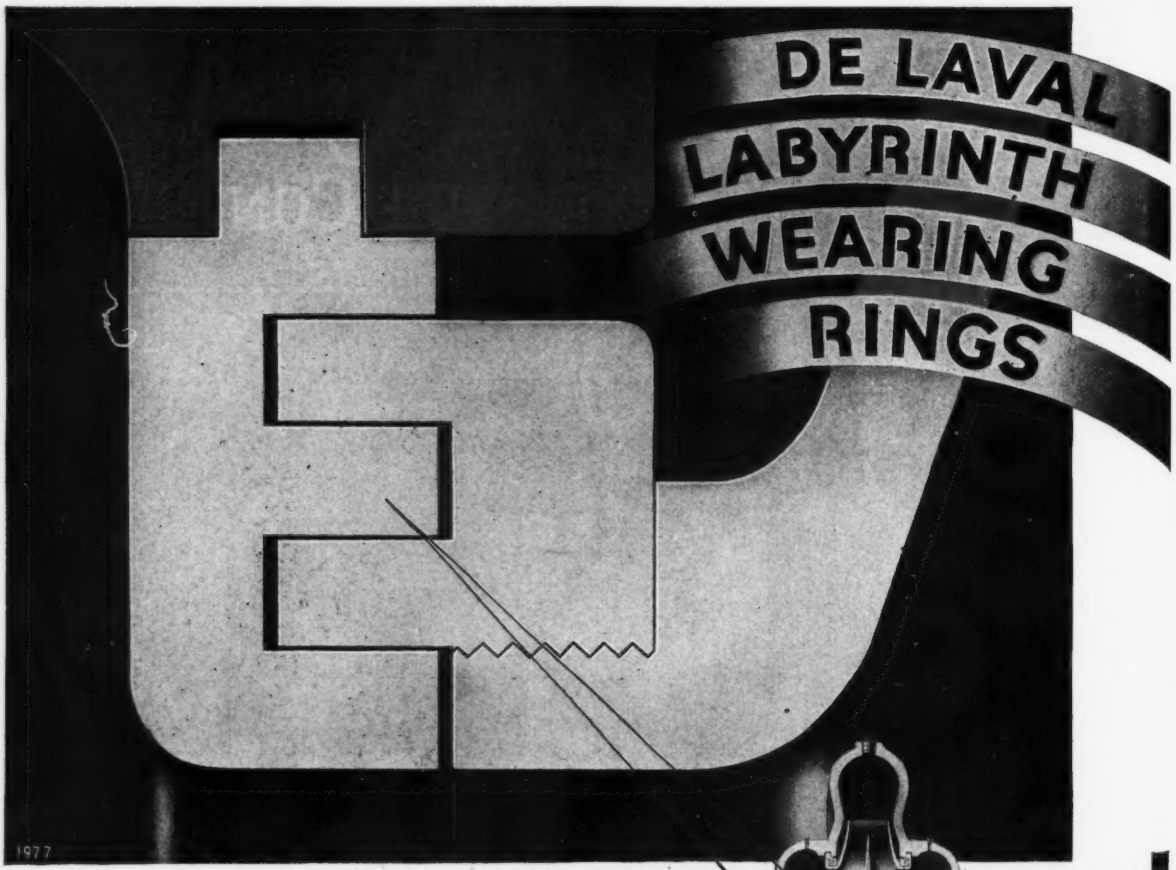
The Calibrated Control Index, "Throttling Range and Automatic Reset" Dials are easily accessible. There is no need to dismantle the instrument to obtain the desired control results. Only Brown Air-O-Line gives you these advantages

Brown Air-O-Line is more than a controller—it is a system of control that will aid you to reduce costs, improve quality and speed up production.

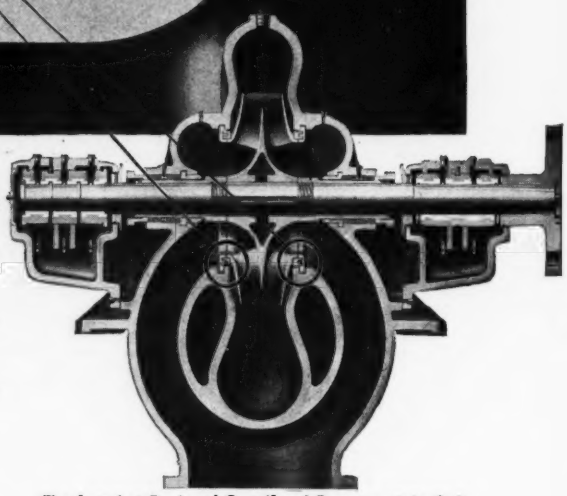
Catalog No. 8901 fully describes the outstanding features of Air-O-Line—the modern temperature controller. Write for a copy. The Brown Instrument Company, *a division of Minneapolis-Honeywell Regulator Co.*, 4510 Wayne Ave., Philadelphia, Pa. Branches in all principal cities. Canadian factory: 117 Peter St., Toronto. European Address: N.V.N. Minneapolis-Honeywell Co., Wydesteeg 4, Amsterdam-C.

BROWN *Air-o-Line* THERMOMETER CONTROLLERS

OUTSTANDING PERFORMANCE WITH SIMPLICITY

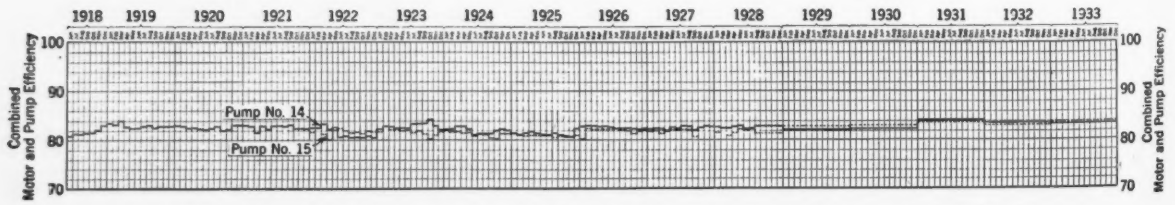


- The most notable development in centrifugal pump design;
- Sustain efficiencies for years without repair or overhaul expense;
- Hold leakage to a minimum, while permitting relatively large mechanical clearances;
- Reduce wear because of both the lower velocity of flow and the greater initial clearance;
- Made to limit gages and easily renewable;
- No finishing cut required on impeller ring after mounting;
- Save replacing impeller or reboring casing.



The fact that De Laval Centrifugal Pumps sustain their high efficiencies for years makes them a most profitable investment. Official records of tests and maintenance costs substantiating this statement are given in Catalog E-1166, sent upon request.

3200



Efficiencies maintained over a period of 15 years by two De Laval high head pumping units at Minneapolis.

DE LAVAL STEAM TURBINE CO., TRENTON, N. J.

THERE IS A DU PONT BLACK DYESTUFF

r every paper use

HE colors listed below are suitable for both surface and beater application. Careful control manufacture assures the user of uniform prod- s at all times.

ONTAMINE* Black E and E Double

sess very good solubility and fastness to light. tensively used as a base for blacks on all grades stocks and on all papers.

ONTACYL* Blue Black SX

ry soluble and possesses good light fastness. rticularly suitable as a base for all gray and ck calender colored or dipped shades. Is also ommended for "covering" ground wood shives beater colored sheets.

Pont Fiber Black N

purified direct black used for impregnated and ated papers, vulcanized fiber, etc. It does not ed into the zinc chloride solutions or into the sh waters.

Pont Nigrosine WSB Powder and Crystals
Pont Nigrosine WSJ Powder and Crystals

onomical for light to dark gray shades on all ades of stock. Each is soluble and has very od fastness to light.

ULFOGENE* Carbon 4GCF Grains
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lfur blacks which are very fast to light and ve no tendency to bleed. Valuable for dyeing ck fibers for granite papers. Used for deep acks which must be extremely fast to light and as free as possible from bleeding or smudging.

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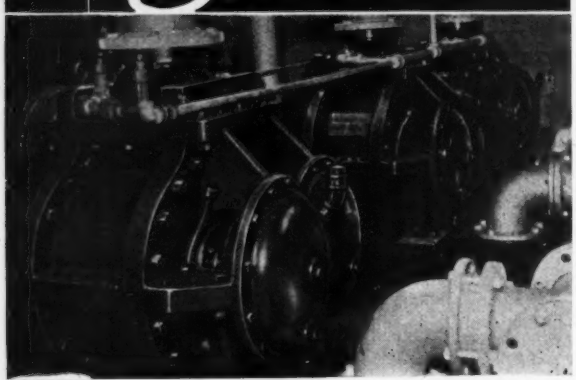
ANIC CHEMICALS DEPT., DYESTUFFS DIVISION
WILMINGTON, DELAWARE

Maintain STEADY SUCTION Save on Power



Experience in the paper industry, dating from the first pioneering application of vacuum pumps to paper machines, has established the value of the Roots-Connersville design. In our Improved Herringbone Gear, Roller Bearing Vacuum Pumps the effectiveness of this Positive Displacement in producing steady vacuum at low power and maintenance cost will be of interest to those seeking to lower their cost per ton.

For up-to-date information on vacuum pumps, ask for bulletin 50-B11.

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NATIONAL Paper Dyes

NEWSPRINT WHITES

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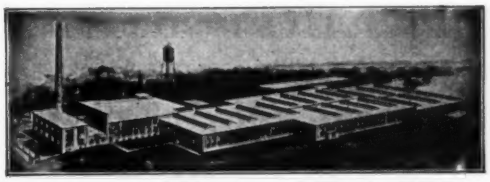
ALBANY, N.Y.

Manufacturers of Kenwood Felts and Jackets for all Pulp and Paper Making Purposes since 1870



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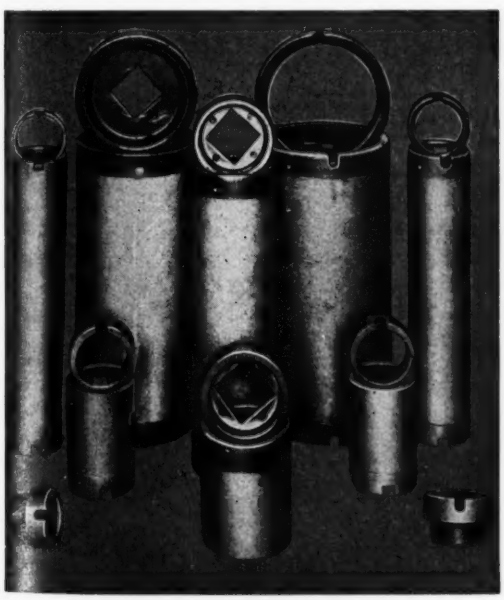

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C A P S — **C O R E S**

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

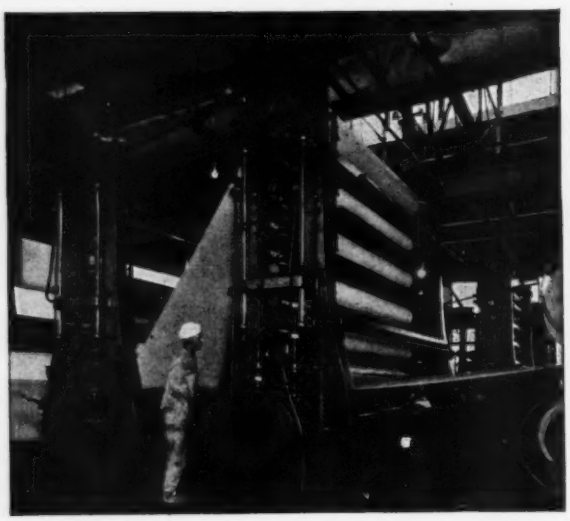
Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This new patented feature of reenforcement gives added strength and durability.

Samples of caps or cores will be gladly submitted.

ELIXMAN PAPER CORE COMPANY, INC.

CORINTH, N. Y.



FARRELOY ROLLS

Cut the Cost of Roll Maintenance

FARRELOY Rolls with a hardness of 76 to 80 Scleroscope represent a notable advance in roll manufacture and offer definite advantages for water finish paper or other applications where operating conditions are especially severe.

These alloy rolls are 7 to 10 points harder than chilled iron, offer greater resistance to wear, do not rust or pit so quickly and retain their shape and finish longer.

Fewer shutdowns for regrinding and greater continuity in the production of uniform quality paper are some of the economies that reduce operating and maintenance costs.

They are made under exacting metallurgical control and with the superior finish and accuracy which have given Farrel Rolls their reputation as the highest standard of excellence in the paper industry for three-quarters of a century.

We shall be glad to give you full particulars on FARRELOY Rolls for your requirements.

FARREL-BIRMINGHAM
COMPANY, INC.
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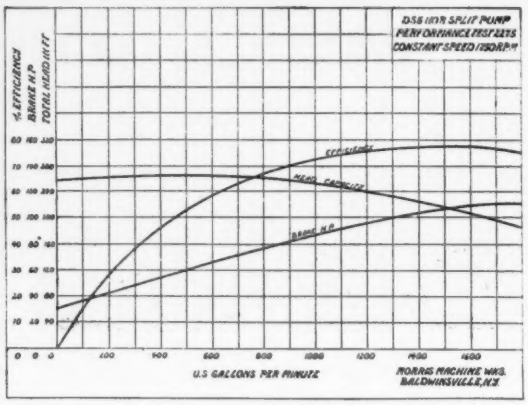
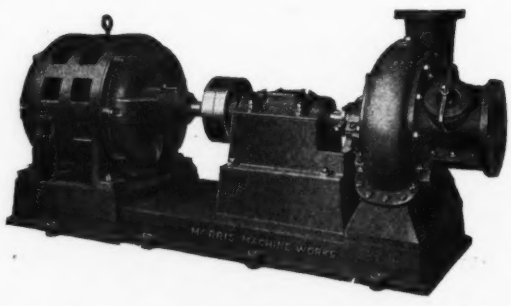
The MORRIS
HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



Efficiency curves should have plateaus — not peaks . . .

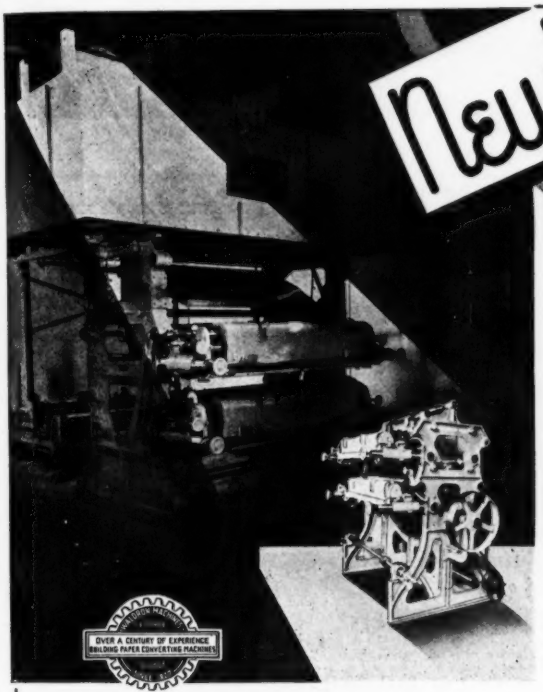
If a centrifugal pump has an efficiency curve that drops off sharply from both sides of the maximum, the slightest change of pressure or capacity will cause a marked loss of efficiency. Morris Pumps have flat efficiency curves, which means that they may be operated over a wide range of conditions without material decrease of efficiency. If you want centrifugal pumps with this helpful characteristic, be sure to get a Morris Quotation. Write for special bulletin on Morris Pumps for pulp and paper mill services.



A material consideration . . .

Morris has no "stock" pumps. Each Morris pumping unit is specially designed and built, not only for its individual operating conditions, but further, to include selection of metal and proportions of parts that will be correctly suited to the material to be pumped. Whether you wish to handle dense pulp, miscellaneous trash, or clear liquids, Morris can offer a design that has amply demonstrated long-maintained efficiency and low upkeep expense. Bulletins on any Morris Pump type will be sent on request.

For authoritative recommendations on any pumping problem, write to Morris Machine Works, Baldwinsville, N. Y. Representatives in principal cities.



New! WALDRON Fluid INK PRESSES

These new Waldron machines, regardless of size, are *all purpose fluid ink* presses, adaptable for use of water colors, aniline, pigmented lacquer, rotogravure and, if necessary, regular printing inks. They also accommodate themselves to surface printing using practically any kind of rollers, plates or intaglio engraved shells. Without doubt, the most versatile presses ever developed.

Design permits frames and color units to be added after installation without discarding original machine.

Either center or drum type rewinding may be built into the outfits as well as the drying apparatus.

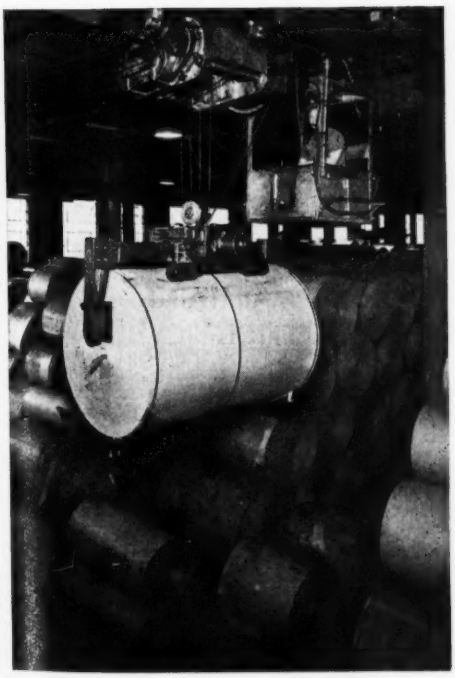
Write our engineering department for full details and advisory engineering service.

JOHN WALDRON CORPORATION

Main Office and Works—NEW BRUNSWICK, NEW JERSEY

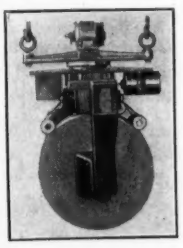
CHICAGO NEW YORK PORTLAND, ORE.

MANSAVER GRABS



INCREASE YOUR CRANE EFFICIENCY
MAKE HIGH STORAGE SAFE & EFFICIENT
CAN BE USED ON PRESENT OR NEW CRANES

Mansaver Grabs are engineered and constructed as carefully as the most exact piece of equipment used in a paper mill. They have been used for years in some of the largest paper mills in the country. Their uses are manifold in handling raw materials and finished products. All types for all demands.



Swivelling type

SUPPLIED FOR HORIZONTAL OR VERTICAL HANDLING OF ROLLS—BALES—BARRELS, ETC.

SEND FOR BULLETIN 1001

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"NON-USERS ARE THE LOSERS"

TENAX FELTS

FINISH AND TRIM

FINISH—TEXTURE—TRIM

FINISH is the most-often-mentioned quality in all papers and bond. To attain the optimum, use *TENAX FELTS* in all positions.

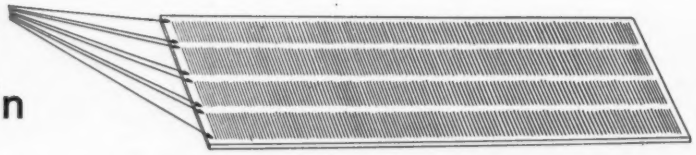
TEXTURE is often a very necessary quality, and uniformity is best obtained by using *TENAX FELTS* in all positions. We specialize in layout for this important quality.

TRIM—A most important feature of *TENAX FELTS*. Use them in all positions to obtain maximum trim.

"Non-Users Are the Losers"

LOCKPORT FELT COMPANY
NEWFANE, N. Y.—U. S. A.

Only One-Half Inch of Clogged Slots Here



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55% Loss In Screening Capacity

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SMOOTH, SLIPPERY **CRODON** PLATE KEEPS SLOTS CLEAN AND MAINTAINS MAXIMUM SCREENING EFFICIENCY.

The trade-mark CRODON assures the best in chromium plate

Many representative mills consistently attain substantial cost-reductions and trouble-free operation with the aid of CRODON plate. Bulletins describing specific applications are available . . . Write for further information.

Chromium Corporation of America

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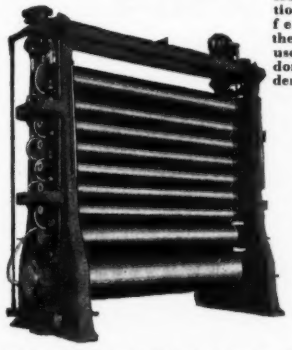
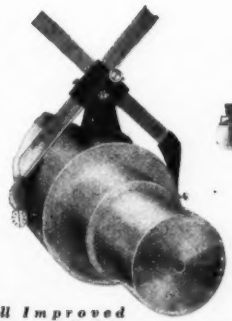
PROFITS you earn but never get—are gobbled by OBSOLETE EQUIPMENT

MODERNIZE

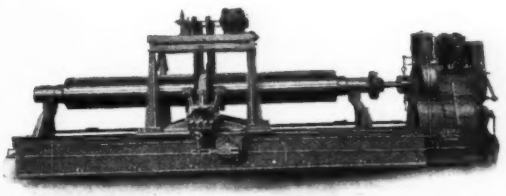
Lobdell Calender Stacks are accurate, durable, easily operated machines, equipped to operate with Electric Motor, Hydraulic or Ratchet Lift—all controlled from the floor. Modern, trouble-free lubrication is another feature of these widely used and endorsed Calender Stacks.



Lobdell "Puraloy" Chilled Calender Rolls assure maximum hardness and a perfect surface. They minimize pitting and wear, and are therefore ideal for the very severe conditions of water finish papers. An "exclusive" Lobdell product.

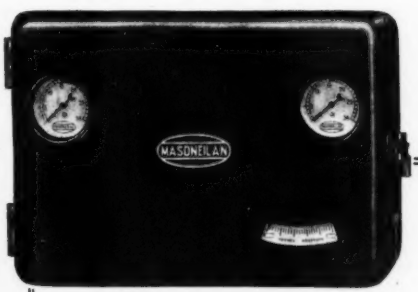


Lobdell Improved Micrometer Roll Caliper—an indispensable, absolutely accurate instrument for all mills—either to keep a check on regrinding, or on the condition of Calender and Press Rolls. Light in weight, easily adjustable and extremely accurate.



The Lobdell Roll Grinding Machine—the "last word" in Roll Grinders. This machine is not only compact and accurate, but possesses two exclusive Lobdell Features—the automatic Crowning Device (the only device which produces the exact predetermined Roll Crown, by simple setting of a micrometer scale), and provision for leveling the bed (to compensate for wear). And, for greater efficiency, rigidity and convenience, the new V-Belt Wheel Drive has just been added.

LOBDELL
CAR WHEEL COMPANY
100 Years in Business
WILMINGTON·DELAWARE



Set a Stock Level *and keep it SET*

With this PLUG-PROOF AUTOMATIC CONTROL

Here is the system you need for holding stock *on the level* in your head boxes, couch pits, thickeners, washers, save-alls and other open stock tanks.

This advanced Mason-Neilan System is trouble-free.

- **Valve and transmitter cannot plug.**
- **Transmitter is calibrated at factory—stays set on the job.**
- **Stainless steel diaphragm responds instantly to slightest changes in tank levels.**
- **Control valve compensator prevents over-control.**
- **Controlled level set and changed easily with a key.**
- **Indicates or records controlled levels.**

Send for bulletin S. L. C.

The control valve used with this system has a specially designed body to prevent plugging! No stuffing box is used and all working parts are separated from flowing stock.

Mason-Neilan No. 5086 Dial Indicators and No. 5076 Recorders of stock level are also available.

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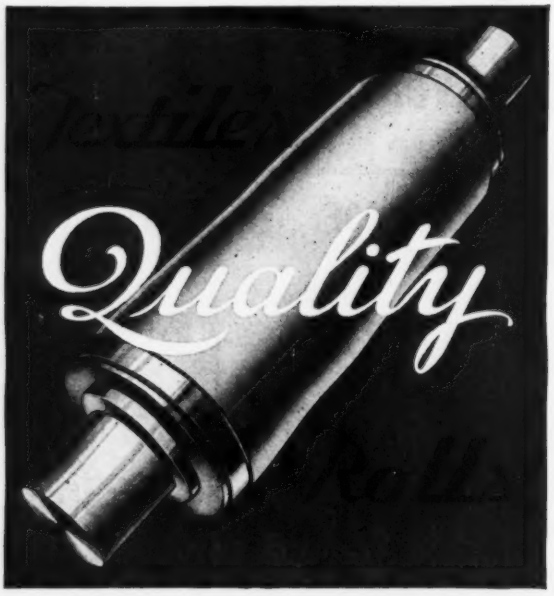
SANDY HILL SUSPENDED FOURDRINIER PAPER MACHINE

STURDY AND RELIABLE FOR HIGH SPEEDS

THE SANDY HILL IRON & BRASS WORKS

HUDSON FALLS, NEW YORK



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Troubled with Slime Growths?

Then, here's the answer to your problem. Magnus Slime Remover has the high penetrative properties to remove slime with ease and efficiency at low cost. Its quick penetration and ability to loosen, disperse and suspend the slime growths and adhesions, insures their ready and complete removal by simple rinsing.

Write for our illustrated folder and other detailed information on Magnus Slime Remover.

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GIANT RAG CUTTERS

The standard of the world for over 60 years.

In capacities from 1,500 to 10,000 pounds per hour. Single Tandum Multiplex.

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For Cutting
RAGS — BURLAP — BAGGING — ROPE — JUTE BUTTS, MAGAZINES, CATALOGS & OLD PAPERS.

ROLL BARS —
BED PLATES
RAG CUTTER KNIVES

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NO EQUAL ON THE JOB!

Those who have known the joy of wandering afield with gun and dog, know, too, the perfection in performance of the thoroughbred setter. Let the quarry be sighted . . . and he stands in frozen immobility . . . dependable, faithful to his trust and job . . . bred and trained to the discipline of the hunt.

Just as responsive to specific performance requirements . . . as dependable on the job . . . are WOOD'S Power Transmission Devices. And for much the same reason. All WOOD'S equipment embodies the inbred quality of the best of raw materials . . . expertly, carefully worked into designs of proven, practical worth. All is calculated to assure the best, longest and most efficient service from every piece of equipment, no matter what job it must do.

Consequently, for controlled, power-thrifty performance, WOOD'S products are the market's unequaled value.

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Shafting, Hangers, Collars, Pulleys, Friction Clutches, Ball Bearings, Flexible Couplings, Rope Sheaves, Pillow Blocks, Belt Contactors, V-Belts, V-Belt Sheaves and complete V-Belt Drives.

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50 Church St., New York City ... 387-391 Atlantic Ave., Boston
MEMBER: The Mechanical Power Engineering Associates

THIS PIPE NEEDED
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During past months we received so many calls for Armco Spiral Welded Pipe that we simply couldn't turn it out fast enough. We put in more equipment, increased our facilities. And now . . . as before . . . we are ready to supply your needs promptly . . . dependably.

Just mail your specifications and we'll deliver Armco Spiral Welded Pipe . . . complete with fittings . . . for your specific job. It will go together quickly and maintain a high carrying capacity throughout many years of trouble-free service. So you not only save money . . . you boost efficiency by using Armco Spiral Welded Pipe. The American Rolling Mill Company, Pipe Sales Division, Middletown, Ohio.

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2/10 of 1% . . .

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When ASKANIA Control is applied to paper-making machines, it can control the amount of moisture to within 2/10 of 1%. By doing so it has actually helped to earn as high as $10,000 per large machine in a year's time. And it has made proportional savings on smaller machines. ASKANIA Control not only makes it possible to earn a greater profit, but it also contributes to the manufacture of a better printing paper. ASKANIA Control leaves the operator free for other duties.

Let our Engineers submit recommendations and estimates. Write for Bulletin No. 102.

ASKANIA REGULATOR COMPANY

1603 South Michigan Avenue Chicago, Illinois

Montague Specialties

Automatic White Water Sampler	Gives a thoroughly composite sample of white water, without reliance on the human equation, with no expense for power, and with a minimum of attention.
Curtis Hydraulic Grinder Lathe	Supplied for any make of grinder, new or old. Keeps stone surface in proper condition for most efficient grinding. Increases production and improves quality of pulp.
Automatic Water Jet	Keeps cylinder mould mesh clean to function properly and lengthens its life. Simple to install. Driven from mould shaft or other convenient point.
Ti-Machine Burrs	Steel shell burrs made in standard sizes and cuts suited to the paper trade. Also semi-steel sectional burrs 3-4-5-6-7 cuts per inch.
Ti-Machine Doctor Blades	Machining doctor blades is a simple matter. Subsequent straightening to relieve the steels of all strains and stresses is a manual operation amounting to an art. Ti-Machine Doctor Blades are straightened by workmen skilled by long experience at this special task.

Montague Machine Company

Turners Falls, Mass.

Profits DOWN THE DRAIN!

Slime accumulations like this — with consequent expensive clean-up costs — are eliminated by chlorination.

When clean-up costs go sky high because of slime accumulations in pipes and on screens, with losses in stock, water, heat and labor—it's time to investigate slime elimination.

Over 200 leading paper mills are effecting major economies by eliminating slime with chlorine and ammonia—accurately controlled with W & T apparatus—and at a cost of from 1½c to 6c per ton of product.

In addition to materially reducing clean-up costs, slime elimination will:

Increase production
Lengthen felt and wire life
Reduce chemical costs
Improve paper quality
Overcome slime breaks, and
Effect production economies that reflect in increasing profits

Research Publication No. 327 "Slime in Paper Mills—Its Origin and Prevention" discusses slime elimination. Ask for your copy.

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Manufacturers of Chlorine and Ammonia Control Apparatus

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Automatic pH control
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PAPER TRADE JOURNAL

ESTABLISHED 1872

SIXTY-FIFTH YEAR

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

Published Every Thursday by the LOCKWOOD TRADE JOURNAL CO., Inc.

GEO. S. MACDONALD, President — JOSEPH P. HORGAN, Secretary

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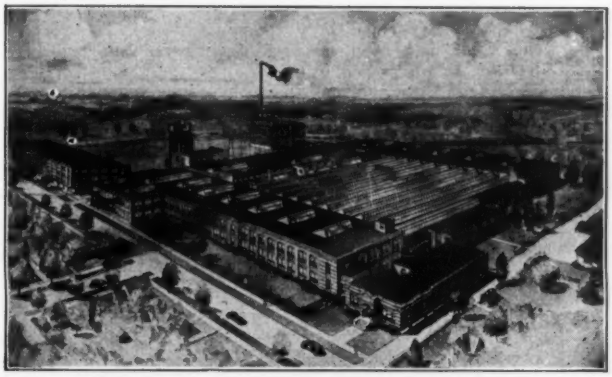


THE HOUSE OF ORR SUGGESTS A TEST

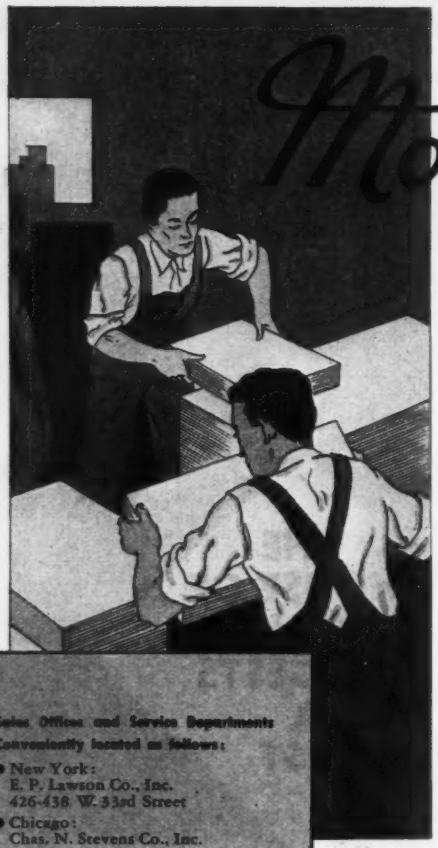
No ordinary line of felts ever built the big modern plant reproduced above.

On the contrary, that plant was built by the Orr line supported by the goodwill of hundreds of paper mills.

Perhaps you are an Orr user. If so, fine and many thanks; if not, you are invited to compare the performance of Orrs with the performance of the make you are using. It is highly probable that you will learn something very much to your advantage.

THE ORR FELT AND BLANKET COMPANY
PIQUA, OHIO

ORR FELTS



More Speed with
LESS LABOR ON THE SEYBOLD AUTO SPACER

● When accuracy of cut is assured to 3/1000 part of an inch, it is certain that net profit will be increased. Then when production is enormously increased, an all time top is reached in earnings.

And that exactly is the result obtained by paper mills, paper convertors, and plants turning out loose leaf forms, second sheets and other similar materials, when a Seybold Precision Auto Spacer is used. Because the back gauge moves instantly to the next desired cutting position and stops automatically, exactly where cut is to be made. This permits operator to be removing finished work. Error is a thing of the past. Both dimensions of the work can be cut and finished without removing the work from the machine. Install a Seybold Auto Spacer and bring profit production to a new high.

HARRIS•SEYBOLD•POTTER COMPANY
SEYBOLD DIVISION DAYTON, OHIO

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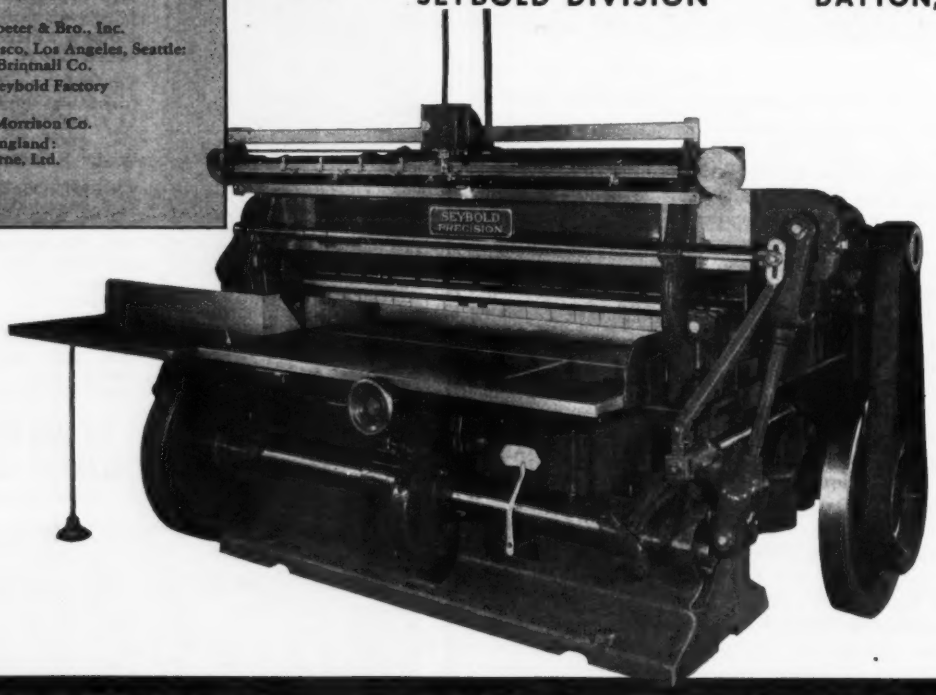
- Toronto: The J. L. Morrison Co.
- London, England: Smyth-Horne, Ltd.



SEYBOLD AUTO SPACER

PAPER TRADE JOURNAL

Reg. U. S. Pat. Off.

PAPER — SIXTY-FIFTH YEAR — PAPERS

Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with PAPER TRADE JOURNAL.

Vol. CIII, No. 18 Thursday, October 29, 1936

Established Sept. 21, 1910
Consolidated Feb. 19, 1925
with PAPER TRADE JOURNAL.

More Than $50,000,000 for New Pulp and Paper Mills in the South

New construction in the paper and pulp industry during the past twelve months was greater than for many years past, while new installations of machinery and additions to existing mills were numerous.

There was a remarkable movement towards the South, where paper and pulp mills proposed for and under construction represent an investment of more than $50,000,000.

Union Bag & Paper Co.

The first unit of the new Savannah, Ga., plant of the Union Bag and Paper Corporation was placed into operation recently and was formally opened on October 1. This plant includes a kraft paper and pulp mill and paper bag factory. The approximate cost of the plant before it is completed next June will be seven million dollars.

When all units are in operation the plant will consume 450,000 tons of wood annually, and 120,000 tons of paper and pulp and paper bags will be shipped out of the mills every year. About 20,000 tons of salt cake and 6,000 tons of lime will be required.

West Virginia Pulp & Paper Co.

Construction of a 500 ton pulp and kraft paper liner mill for the West Virginia Pulp and Paper Company has been started at Charleston, S. C. The cost of the plant will be approximately $5,000,000, with machinery.

The first unit, which will be placed in operation early next year, will have a capacity of 250 tons of .016 liner board, for which there is a steadily increasing demand.

The mill will be equipped with one Fourdrinier machine with 240-inch wire. The pulp mill will be equipped with four digesters to produce unbleached kraft pulp.

Champion Paper & Fibre Co.

A new kraft pulp mill is being constructed for the Champion Paper and Fibre Company at Pasadena, near Houston, Tex. It is to go into operation early in 1937.

The estimated cost of this project is close to $3,500,000. It will consist of a group of large buildings for production of long-fibre bleached and semi-bleached sulphate pulp, under a new process and will have an initial rated output of about 150 tons per day.

Crossett Lumber Co.

The Crossett Lumber Company is building a $4,000,000 pulp and paper plant at Crossett, Ark., which will probably be placed in operation early in 1937.

The mill is to have a capacity of 150 tons of sulphate pulp daily, 100 tons of which will be converted into wrapping paper and bags.

The paper making machine is being installed by the Bagley & Sewall Company and is 210 inches in width.

Southern Kraft Corp.

Ground has been broken at Georgetown, S. C., for an $8,000,000 kraft paper and board and sulphate pulp mill for the Southern Kraft Corporation, one of the principal subsidiaries of the International Paper Company.

The new plant will employ more than 2,200 men and will have a capacity of 215,000 tons yearly, making it the largest kraft mill in the world.

Brunswick Pulp & Paper Co.

An extensive new plant is to be built at Brunswick, Ga., for the Brunswick Pulp and Paper Company, a corporation organized by the Mead Corporation, of Chillecothe, Ohio. When completed this project will represent an expenditure of approximately $7,000,000,

The first unit, consisting of a plant for the production of bleached and unbleached kraft pulps, will probably be placed under construction within the next several months.

St. Joe Paper Co.

At Port St. Joe, Fla., the construction of a $7,500,000 kraft paper mill is contemplated by the St. Joe Paper Company.

Under the management of the Mead Corporation, of Chillecothe, Ohio, it is planned to manufacture kraft liner board used in paper containers.

Kieckhefer Container Corp.

The Kieckhefer Container Corporation contemplates the erection of a board mill of 500 tons daily capacity at a cost of $2,000,000.

Sites in Virginia and North Carolina are said to be under consideration.

Container Corp. of America

The Container Corporation of America proposes to construct a new kraft mill in Fernandina, Fla., next year.

The new plant would have a production of 120,000 tons of kraft per year.

Weyerhaeuser Timber Co.

Apart from the South, the principal development in

(Continued on page 146)

New Kraft Pulp and Paper Mill at Crossett, Ark., to Start Early Next Year

The new kraft pulp and paper mill of the Crossett Paper Mills, Division of the Crossett Lumber Company, being built at Crossett, Ark., is rapidly nearing completion. Shipments of machinery are being received on schedule and present indications are that the mill will be in production the early part of January, 1937.

Equipment of Most Modern Design

The equipment is all of the most modern design and consists of a continuous causticizing system, lime recovery, Babcock & Wilcox recovery boilers, one of which is equipped to handle bark and sawdust from the wood room. Additional equipment consists of one quadruple effect Swenson Evaporator, four digesters and twelve diffusers. All of the above equipment has been received and for the most part erected. Beaters, screens, jordans and pumps are all installed and ready to operate. The 210 inch Bagley & Sewall high speed Fourdrinier is being erected under the supervision of the manufacturer's representative. The pulp drying machine is about 90 per cent erected.

Eight Artesian Wells

Water will be supplied by eight artesian wells having a capacity of six million gallons per twenty-four hours. The wells were drilled by the Layne Arkansas Company, Stuttgart, Ark. Electric power and gas requirements are to be furnished by the Arkansas Power and Light Company and Mississippi River Fuel Company, respectively. The entire plant was designed by Hardy S. Ferguson & Co., 200 Fifth avenue, New York City, and is being constructed by the Rust Engineering Company, Pittsburgh, Pa.

400 Men Being Employed

At the present time, over 400 men are being employed to rush the completion of this plant.

Painting in Paper Mills

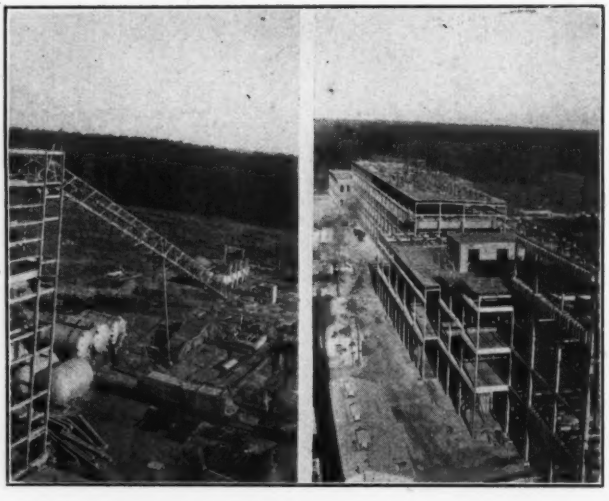
WASHINGTON, D. C., October 26, 1936.—Preservation, illumination and the general morale of workers are all taken into consideration in keeping their plants well painted, according to various paper mill executives. Discussing the subject, J. R. Kimberly of the Kimberly-Clark Corporation, comments that the major part of their painting is done primarily for preservation. "However," he says, "sanitation, illumination, efficiency and the general morale of the operators naturally result and can be counted as benefits resulting from our mill painting."

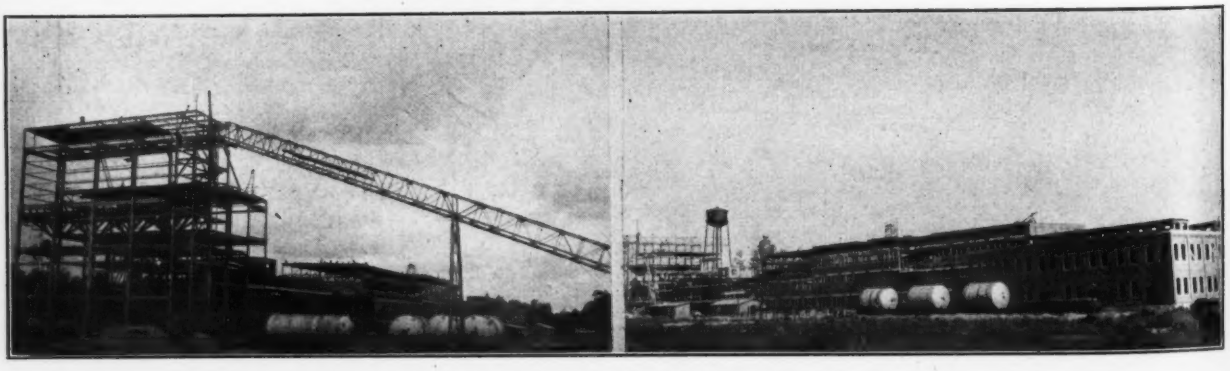
H. R. Harrigan, general manager of the District of Columbia Paper Manufacturing Company reports that his concern finds "that a clean, bright, well painted, orderly and sanitary mill tends to improve the morale of our men and greatly improve our product."

"Arriving at our paint program," says Stuart E. Kay, assistant manager of the International Paper Company," "our company takes into consideration the fact that paint makes for sanitation, illumination and efficiency."

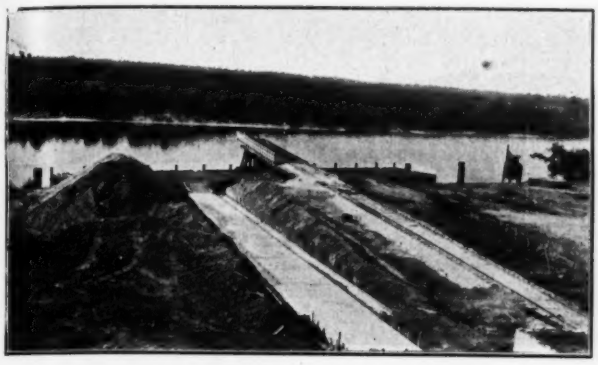
Regarding the frequency of paint application, Mr. Kimberly says that in the mills of his corporation, interiors are repainted every one to six years—depending upon the type of exposure. "In our mill," states Mr. Harrigan, "we are painting continually. The exposed parts are re-coated about once every three years." At the International mills, their policy is to paint as often as necessary from a conservative maintenance point of view.

Dealing with the question of color schemes, Mr. Kimberly explains that, in general, their interior painting is confined to light colors and aluminum — except in cases where the exposure is such that more resistant paints are required.

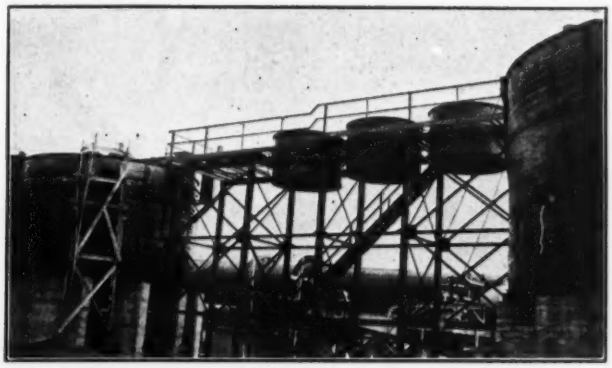




VIEWS OF CROSSETT PAPER MILLS UNDER CONSTRUCTION



LOOKING NORTH FROM STORAGE AND SHIPPING BUILDING, SHOWING DOCK, RAMP AND RAILROAD SIDING.



VIEW IN CAUSTICIZING PLANT SHOWING CAUSTICIZING TANKS ON STRUCTURAL STEEL SUPPORTS AND LIME KILN IN BACKGROUND.

New Texas Mill of Champion Paper & Fibre Co. Is Rapidly Nearing Completion

The mill of the Champion Paper and Fibre Company being built at Pasadena near Houston, Tex., will have a capacity of 300,000 pounds daily of bleached kraft of highest quality and constitutes a modernization of the bleached kraft process which has been in course of development at the Canton mill of the company for the past ten or fifteen years.

Will Produce Chlorine, Caustic Soda and Lime

The mill will be self contained, as to production of chlorine and caustic soda, and will produce lime from local raw materials. The plant has its own wharf on the Houston Ship Channel and is favorably situated for shipment by barge on the Intracoastal Canal and Mississippi Valley waterways to all points in the middle west and in addition has access to seagoing vessels for shipment abroad or to the Atlantic seaboard. The initial movement of pulp, however, will be for the most part to the Hamilton, Ohio, mill of the Champion Paper and Fibre Company.

Steam and Natural Gas

Steam for the process use will be furnished from the neighboring plant of the Houston Light and Power Company. Natural gas from the Houston Pipe Line Company will be supplied for lime kiln and other furnace uses.

Pine Wood, The Chief Raw Material

The pine wood which is to form the chief raw material of the Houston operation will come from the Piney Woods section of Texas to the North and East of Houston and will be delivered to the plant by truck, by rail and by barge.

To Cost In Excess of $3,500,000

The plant is estimated to cost somewhat in excess of $3,500,000.00; will give employment to approximately five hundred men; is expected to start production in the early months of 1937, possibly January or February.

Morton C. Tuttle Co. General Contractor

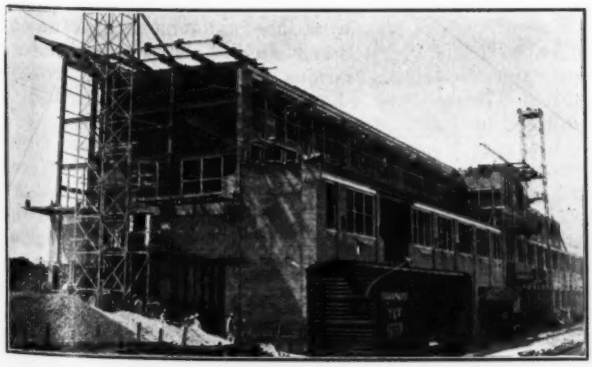
Morton C. Tuttle Company of Boston, Massachusetts, is the general contractor. J. E. Sirrine & Co., of Greenville, S. C,. are the engineers and W. R. Crute is the plant manager, representing the owners.

Practically all contracts for material and machinery have been placed.

The Equipment

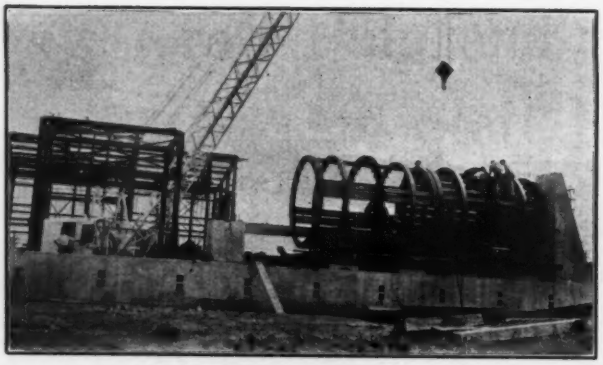
The more important equipment was supplied by the following concerns:

Improved Paper Machinery Company, Nashua, N. H. Plate Screens, Washers and Thickeners, Knotters.

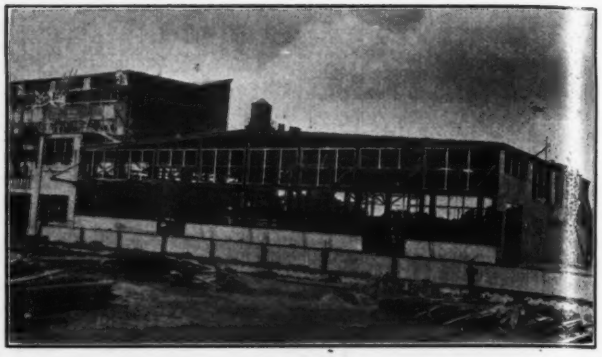


MACHINE ROOM. VIEW LOOKING NORTH WEST.

MACHINE ROOM. VIEW LOOKING SOUTH WEST.



BARKING DRUM FOUNDATION WITH WOOD ROOM IN BACKGROUND. BARKING DRUM BEING ASSEMBLED.



STORAGE AND SHIPPING BUILDING, LOOKING SOUTH WEST.

Wyatt Metal and Boiler Company, Houston, Texas. Steel Tanks.

Baldwin-Southwark Corporation, Philadelphia, Pa. Hydraulic Presses.

Ingalls Iron Works, Birmingham, Ala. Structural Steel.

Laclede Steel Company, St. Louis, Mo. Reinforcing Steel.

D. J. Murray Manufacturing Company, Wausau, Wis. Wood Chippers, Barking Drums.

U. S. Cast Iron Pipe and Foundry Company, Burlington, N. J. Sulphate Evaporators.

Traylor Engineering and Manufacturing Company, Allentown, Pa. Lime Kiln.

Hedges-Walsh-Weidner Company, Chattanooga, Tenn. Digesters.

The Dorr Company, New York City. Filters, Causticizing Equipment.

Oliver United Filters, New York City. Filters, Pumps.

The Henry Vogt Company, Louisville, Ky. Bark Fired Boilers.

Combustion Engineering Company, New York City. Recovery Boilers.

General Electric Company, Schenectady, N. Y. Machine Drive.

Black-Clawson Company, Pulp Machine.

Fibre Making Processes, Inc., Heaters and Pumps.

C. H. Wheeler Manufacturing Company, Charlotte, N. C. Evaporator Condensing Equipment.

Ingersoll-Rand, Stock and Water Pumps.

J. O. Ross Engineering Corporation, Chicago, Ill. Exhaust and Ventilating Systems.

Nash Engineering Company, South Norwalk, Conn. Pumps.

The Jeffery Manufacturing Company, Columbus, Ohio. Conveyor Equipment.

Buffalo Foundry and Machine Company, Buffalo, N. Y. Evaporators.

Westinghouse Electric and Manufacturing Company, Motors and Starters.

Noble and Wood Machine Company, Hoosick Falls, N. Y. Agitators and Regulators.

The Baltimore Cooperage Tank and Tower Company, Baltimore, Md. Wooden Tanks.

Dayton Envelope Co. Active

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, October 26, 1936—Since the organization of the Dayton Envelope Company by the Howard Paper Company of Urbana, Ohio, and its allied mills, the Aetna Paper Company of Dayton and the Maxwell Paper Company of Franklin, Ohio, material progress has been made by the firm until today it is recognized as one of the leading concerns of its kind in the country.

On October 15 the company began the manufacture into envelopes of its own mill brands, Correct Bond, Maxwell Bond and Howard Bond, according to Mr. Howell Howard, treasurer and general manager, of the company, and the response of the various agencies throughout the United States has been immediate and substantial.

In fact, since the establishment of the envelope plant in its commodious factory on Miami Chapel Road, Edgemont, formerly known as the naval ordnance building, the company has been operating steadily on orders from all sections of the United States.

"The response of the agencies has exceeded our fondest expectations," said Mr. Howard, when questioned relative to trade conditions prevailing since the first of the year. "Our greatest trouble is to make deliveries. We are operating more machines and naturally have added considerably to our working force. Everything at this time would indicate a steady continuance of operations, particularly since we are utilizing our own mill brands which are well known to the trade and the public."

Not only is the Aetna mill in Dayton contributing to the product, but the mills at Franklin and Urbana are furnishing their share of bond paper to be converted into envelopes for private and commercial consumption.

Dayton, it seems, is to be congratulated in acquiring our enterprise that will add greatly to its manufacturing prestige. With aggressive and experienced mill men behind the project, there is no question of its future success.

Things You Should Know About Your Roof

The problem of how to reduce maintenance expense on industrial roofs is discussed simply and with numerous easily understood illustrations in a new 28-page booklet entitled "Things You Should Know About Your Roof" published by Johns-Manville.

How roof troubles start, and how best to prevent them are subjects of discussion, and graphic information is given on how roofing felts should be laid, how flashing should be applied, how the joints in the coping should be protected, and how roofing should be placed around drains, skylights and angle supports.

The book describes the engineering data on roofs, which is supplied to Johns-Manville Approved Roofing Contractors, and gives information on J-M's Million-Dollar-to-Lend Plan, for paying for roofing work on time payments.

★ ★ ★ A VALVE FOR "WEAR AND TEAR" *Service*

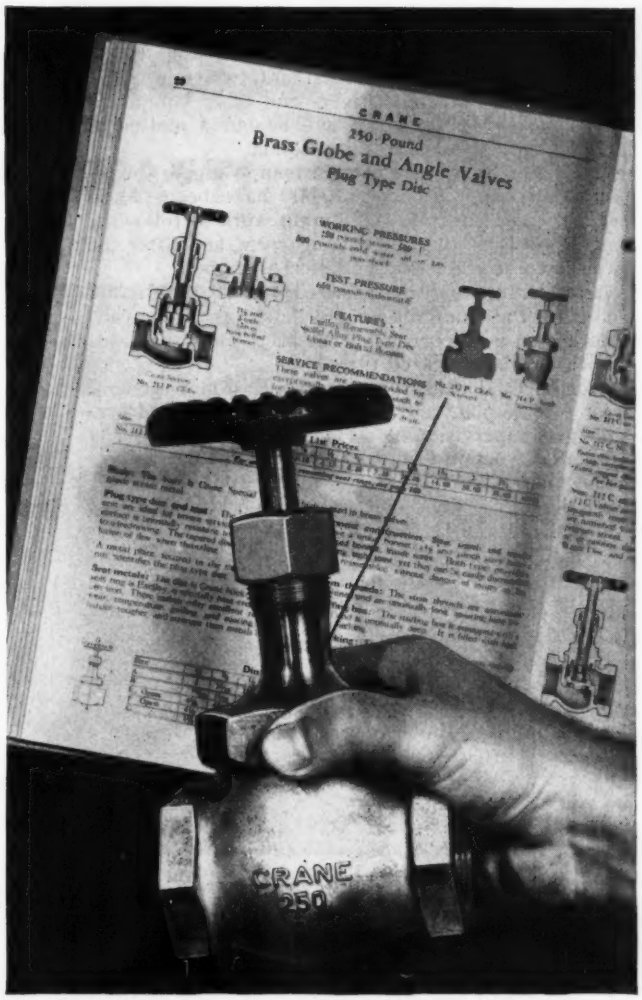
● For throttling, blow-off and other severe services in the pulp or paper mill and its power plant, it would be difficult to find the equal of the Crane No. 212P Brass Globe Valve and its companion angle valve, No. 214P.

The plug-type disc has been especially designed for easy regulation of flow when throttling and the wide seating surfaces offer excellent resistance to foreign matter, wire-drawing, wear, temperature and scoring. The metals used are harder, tougher and stronger than ordinarily used in brass valves.

The bonnet-joint construction provides a strong, tight joint which can be easily and quickly dismantled and reassembled without injury to the valve. The stem threads are accurately machined and the threaded length is unusually long, assuring long life.

The Crane line of valves and fittings for pulp and paper mills is complete. Each is built to those high standards of metal control, design, workmanship and precision which are always found in Crane valves and fittings. For general over-all economy, standardize on Crane. The Crane branch or distributor in your vicinity can fill your needs.

Let Profits Pay for Plant Improvements. Use the Crane Finance Plan.



For service recommendations, description, list prices and dimensions on Crane No. 212 P Globe and No. 214 P Angle Valves, see page 20, new Crane No. 52 catalog.

CRANE

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VALVES, FITTINGS, FABRICATED PIPE, PUMPS, HEATING AND PLUMBING MATERIAL

Construction of West Virginia's New Kraft Mill At Charleston, S. C., Progresses Rapidly

Rapid progress is being made with the construction of the new kraft paper and pulp mill of the West Virginia Pulp and Paper Company, at Charleston, S. C. The plant comprises a group of several units to be equipped for an initial capacity of about 700,000 pounds of pulp and 700,000 pounds of container board per day.

Since June 20, when the work of constructing the $5,000,000 plant was begun, steady progress has been made and today the steel skeleton of the digester building, tallest of the group to be erected in the local unit, two giant chemical tanks, large cranes, pile drivers and other equipment give first hand evidence that it will be but a matter of months before the plant swings into action.

Of the 17,000 piles that are being driven to support building foundations, approximately 10,000 have been put in place so far. The concrete foundation work is following close on the heels of the pile driving crew, and after the foundation men are the structural steel workmen.

The latter in turn will be followed by the roofers and those erecting the sidewalls of the buildings. The walls will be protected with corrugated metal. Much of the interior finish will be in glazed tile.

The Morton C. Tuttle Company, of Boston is general contractor for the plant and the work is being pushed forward under its supervision by several sub-contractors. The Tidewater Construction Company of Norfolk, Va., is putting in the piles. Structural steel is being supplied by the Virginia Bridge Company, of Roanoke, and the corrugated metal sidewalls by the H. H. Robertson Company of New York.

Steam Generating Equipment

Steam generating equipment of 500,000 to 600,000 pounds per hour capacity is being supplied by the Riley Stoker Company of Worcester, Mass., Babcock & Wilcox Company, New York and the Combustion Engineering Company, also of New York. Westinghouse and General Electric are supplying the electrical equipment.

Two complete Riley steam generating units have each a capacity of 225,000 pounds of steam per hour.

Steam will be generated at a pressure of 600 pounds and superheated to 120 deg. F. at an efficiency of 85.4 per cent at a steam output of 768,750 pounds per hour. Each unit consists of a 11,400 square foot Riley ring-flow boiler with superheater, a completely water cooled furnace containing 6,450 square feet of water walls and tubular air heater of 34,000 square feet.

The units are designed for firing by pulverized coal and oil, the choice of fuel depending entirely upon the prevailing price of each fuel.

Riley flue gas scrubbers have been installed to thoroughly wash flue gases from the units, thereby eliminating discharge of fly ash from the stacks. The boiled furnaces will be 18 feet 6 inches wide by 18 feet long and the mud drum will be set approximately 35 feet above basement floor.

Aqueduct Progress

Simultaneously with the erection of the plant at North Charleston progress is also being made on the 22-mile aqueduct from the Edisto river to the Hanahan pumping station, through which, by means of a special pipe line being laid by the West Virginia Pulp and Paper mill, a water supply of from 25,000,000 to 35,000,000 gallons of water a day will be brought to the plant. The water will be carried from the seven-foot "tunnel" by means of a 40-inch reinforced concrete pipeline.

Many lengths of pipe, made by the Lock Joint Pipe Com-Company, on the mill site, have already been turned out and the line is now being laid.

Work on the Edisto tunnel is reported at over a fourth completed. In addition to supplying the pulp mill with all the water it can use, it will also provide water for the city of Charleston and will eliminate all future danger from drought.

The picture at the North Charleston plant today is much different than it was in June. Then in a temporary office that was really but a part of old Warehouse No. 1 applicants for jobs were being received, and the work under way was only the clearing of the site on which the big plant was to be built.

Today the warehouse has been re-roofed, offices have been created in the building, a large force is functioning in them, and outside with cranes and pile drivers in action, riveters putting up the structural steel, carpenters laying forms for concrete foundations, and yet other work going on, it is a scene of orderly activity and industry.

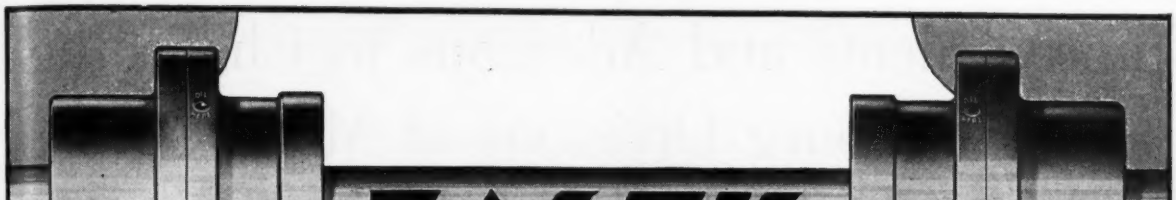
Eastern Mfg. Co. Improves Position

"In line with general strength in securities of paper companies, the 7 per cent bonds of the Eastern Manufacturing Company have enjoyed a good advance", says the Wall Street Journal. "Sales have been made at around 60, against a recent low of 52. There has been some improvement in the position of the Eastern and present indications are, barring unforeseen developments, that the company will close the 1936 calendar year with a small profit. This would be after allowance for bond interest, now in default, and after heavy depreciation charges and expenses of abandoned property.

"Operations for August were in the 'black,' net amounting to $11,183, but for the eight months through August a loss of $8,406 was shown. Interest charges for the eight-months' period amounted to $125,582, while $200,353 was deducted for depreciation. Furthermore the March floods caused a loss of $500,000, which has been absorbed. For the 12 months through August 31, 1936, a loss of $37,418 was shown, compared with a loss of $82,814 a year previous.

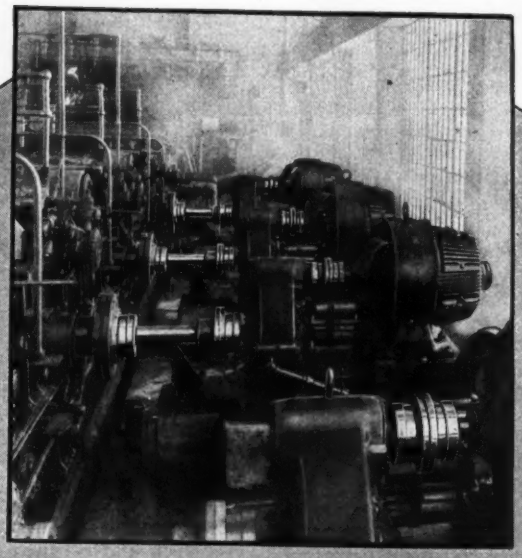
"Despite a satisfactory volume of business in paper the price situation is very unsatisfactory. The rayon pulp activities are profitable, however, not only is the company sold out for the balance of 1936, but the entire 1937 output of some 36,000 tons has been contracted for by an important rayon manufacturer.

"Bond interest on the $1,581,600 Eastern 7s has been in default since June, 1934, and the $521,000 subsidiary Orono Pulp and Paper 6s since July 1, 1934. Although interest, before depreciation, was earned over three times in 1935, (1.27 times after depreciation) lack of cash resources prevented payment. A like situation prevails this year, although there has been a slight improvement in the cash account. Eastern Manufacturing, of course, will have to undergo a reorganization before its affairs are finally straightened out."



FAST'S

SELF-ALIGNING
COUPLINGS
FOR
INTAKE SHAFTS



Fast's Couplings on sectional drives at Washington Pulp and Paper Company, Port Angeles, Washington

AN adaption of Fast's Self-Aligning Couplings makes the intake shaft in effect an integral part of the coupling. In this type of installation, the coupling is "split"—half of it is located at either end of the floating shaft. No supporting bearings are necessary. Their expensive upkeep, attention and replacing is eliminated.

Moisture and dirt cannot harm a Fast's Coupling. The rocking bearings are located in the one position where they will make dust-proof seals. The load carrying oil within the coupling is kept permanently clean.

Specify genuine Fast's all-metal couplings on the machines you purchase and avoid operating trouble.

Koppers Company, Bartlett Hayward Division

BALTIMORE, MARYLAND

Improvements and Additions to Chillicothe and Lynchburg Divisions of Mead Corp.

No. 11 Machine, being the eleventh paper machine in the Chillicothe Division, was installed early in 1936, going into production the latter part of May.

This machine was designed and installed to make exclusively light weight, from sixteen pound to twenty-four pound, sulphite waxing sheets at speed up to 1000 feet per minute. These papers, prior to starting up No. 11 Machine, were being made on other machines in the plant that were not adapted to their manufacture, so No. 11 Machine was installed for this purpose.

No new buildings were necessary for this machine installation. In 1930, when No. 10 Machine was installed, provision was left in the machine buildings for the installation of a second machine at a future date.

Machine Built by Pusey & Jones

This machine was built by Pusey & Jones Corporation, the fourdrinier being second hand but was completely rebuilt by them, and the balance of the machine being new construction.

The fourdrinier of this machine is the Beloit removable type having a wire width of 166 inches standard Voith inlet, bronze breast roll, table rolls and wire return rolls, and 25″ diameter bronze Sandusky suction couch roll. All the above rolls are mounted in anti-friction bearings. The suction boxes are equipped with Broughton unit vacuum control. All Save-all pans are of Allegheny metal.

The Press Part

One press was installed, with provision left for installation of a second one at a later date. The bottom roll of this press is Beloit type, latest design, rubber covered, suction press roll with an upper stonite covered roll. The felt rolls on this press are rubber covered, and the paper carrying rolls bronze. All the rolls are mounted in anti-friction bearings.

The smooth press consists of a lower stonite covered roll, both rolls being mounted in anti-friction bearings.

Drier Section

The drier section consists of 29 main 60 inch diameter paper driers and four 48 inch diameter felt driers. The paper driers are mounted in sleeve bearings and the felt driers in anti-friction bearings. The steam joints on these driers are Pusey & Jones pressure sealing type requiring no lubrication. All the lower driers and the last upper driers are equipped with Vickery-Heisel patented doctors. Felt rolls are turned steel tube rolls mounted in anti-friction bearings.

Condensate system is of the latest type, Midwest-Fulton evacuation system, with aerofin condensate cooling unit, centrifugal condensate pump and Nash vacuum pump.

Complete Sheahan patented paper carrier was installed to carry the sheet from the press through to the calender.

The Calender

One nine roll calender stack was installed with provision for the installation of a second one if desired. The calender rolls are special alloy chilled iron calender rolls, mounted in bronze lined, water cooled journal boxes. The calender stack was equipped throughout with Vickery doctors.

The reel is of the latest design Pope type to handle rolls up to 42 inch diameter.

Camachine Winder

The winder on this machine is Camachine type 18, 158 inch trim width rewind capacity, driven by an A.C. motor through a Horton clutch pulley. This winder is complete with unwind stand.

The drier section and calender are equipped with Bowser pressure, circulating lubrication system.

Driving Arrangement

The various sections of the machine are driven from a line shaft in the basement, the direct current motor driving this line shaft being coupled right in it, by means of cone pulleys to the drive units on the main floor, thence through mechanical friction clutches, enclosed hypoid spiral bevel gear speed reducers and flexible couplings to the various sections of the machine.

Auxiliary Equipment Outside of Machine

The beaters consist of four 3000 pound Midwest-Fulton high speed beaters each driven by individual motors through "V" belt drives.

The beater chest is tile construction throughout of the vertical type with paddle arm type agitator.

Beater chest pump 12″ x 12″ triplex, bronze fitted, plunger stock pump.

Machine chest is tile construction with triplex stock pump duplicate of beater chest equipment.

Jordan equipment consists of two Majestic jordans direct connected to synchronous motors.

The screen equipment consists of two No. 3A non-ferrous Bird screens with provision for the installation of a third screen in the future. These screens are equipped with .012 inch cut chromium plated screen plates. One 12 plate tailing screen completes the screening equipment.

Wire pit, couch pit and clarified water chest are all tile construction throughout.

The Save-all equipment consists of one No. 6 Bird Save-all of non-ferrous construction.

All stock and clarified water pipe lines are wood lined pipe or copper throughout the machine, piping 4 inch and above being wood lined and below 4 inch of copper.

Throughout the whole installation cleanliness of the machine system was one of the main considerations. In chests, piping and all equipment, the material used are non-ferrous or non-corroding with high velocities of stock and water in order to keep the machine system as clean as possible.

Lynchburg Division

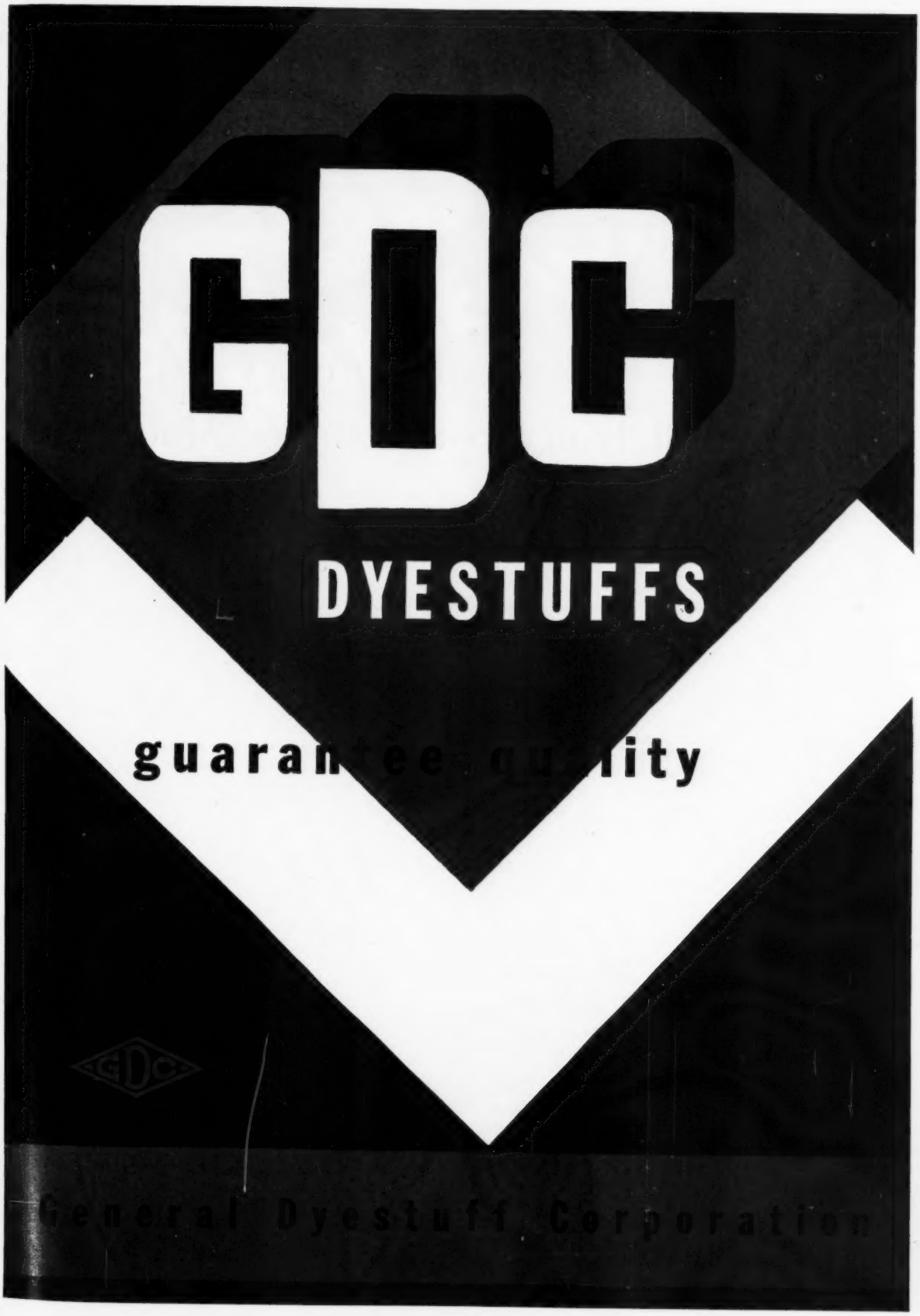
In April of 1935, construction was started on an addition to the present machine room and digester building at the Lynchburg, Va., mill, details of which are as follows:

Machine Room

In order to install an additional machine, it was necessary to build an extension to the present building 35′-0″ wide. The machine was originally built by Rice, Barton & Fales and rebuilt by Shartle Brothers. The description of this machine is as follows:

Type—Fourdrinier

Maximum Trim—122 inches


GDC
DYESTUFFS
guaran ee qu lity
GDC
General Dyestuff Corporation

Hand—Right
Couch—Suction
First Press—Suction
Second Press—Suction
Smoothing Press
Drier Section—50-48 inches x 134½ inches
Drier Felts—3
Felt Driers—4
Calender—1-8 rolls
Reel—2 Spool Upright, Black-Clawson
Winder—No. 18 Camachine
Drive—G. E. Direct Connected Steam Turbine

The machine is producing 70 tons of nine point board from chestnut pulp.

Digester Building

The digester building was doubled in size; however, only two additional digesters were added. This increased the total number to seven and a total capacity of 105 tons of pulp per day.

Three Bauer Mills were installed for the treatment of the pulp for the new machine.

Old Paper Plant (News and Box Clippings)

The old paper plant is entirely new, consisting of a structural steel frame covered with corrugated iron siding.

The equipment consists essentially of one 100 ton Dilts breaker beater with Murphy junk remover and rag catcher. The stock is then treated by a Cowles Refiner, followed by a settling tank. A rebuilt decker thickens the stock for paper mill use.

This plant was designed for a capacity of 100 tons of old papers per day.

Several minor improvements were made, such as a new vibrating type of chip screen, conveyors, etc.

N. Y. State College of Forestry To Install Sandy Hill Iron Works Paper Machine

Most significant in the field of training technicians and potential paper mill superintendents and managers is the decision of the New York State College of Forestry, Syracuse, N. Y., to install, in its department of paper manufacture, a commercial size paper machine. This department has already done conspicuous work in this field under the direction of Professor C. E. Libby. The institution has developed to a high degree the practical aspect of the training of young technical men for the paper mill field as evidenced by the success its graduates have achieved.

The department has recently ordered from the Sandy Hill Iron and Brass Works a commercial size paper machine to be installed in its laboratory, and on this machine the training of the young men taking the pulp and paper making course can be carried to a point which has never before been reached in schools providing training for the industry.

The paper machine is designed to run at a speed which will permit the students at the college to manufacture most grades of paper under the conditions obtained in the mills where they may later work. In addition to giving a very definite idea of the many variables in the operation of a paper machine, there will also be presented an opportunity for individual students to study, through a range of different conditions, some particular aspect of the operation of a paper machine. For example, it may be possible for one student to study all the effects produced in the final sheet of paper by variations in the distance and speed of the shake. In this way data will be developed from which the practical paper maker, who has not time to try all the different possible combinations on his own machine, may draw conclusions of value.

Study of many problems of this nature will be initiated by the paper making department. But in addition, with a really commercial machine available, it is believed that many paper manufacturers will bring their special problems for the school to work out under some mutually satisfactory arrangement.

In order that this machine may satisfy all demands, Professor Libby and Assistant Professor Hisey, have given careful thought to its design. Co-operating with these gentlemen, the engineers of the Sandy Hill Iron and Brass Works have laid out the machine to make it possible to vary the paper making conditions in every reasonable way.

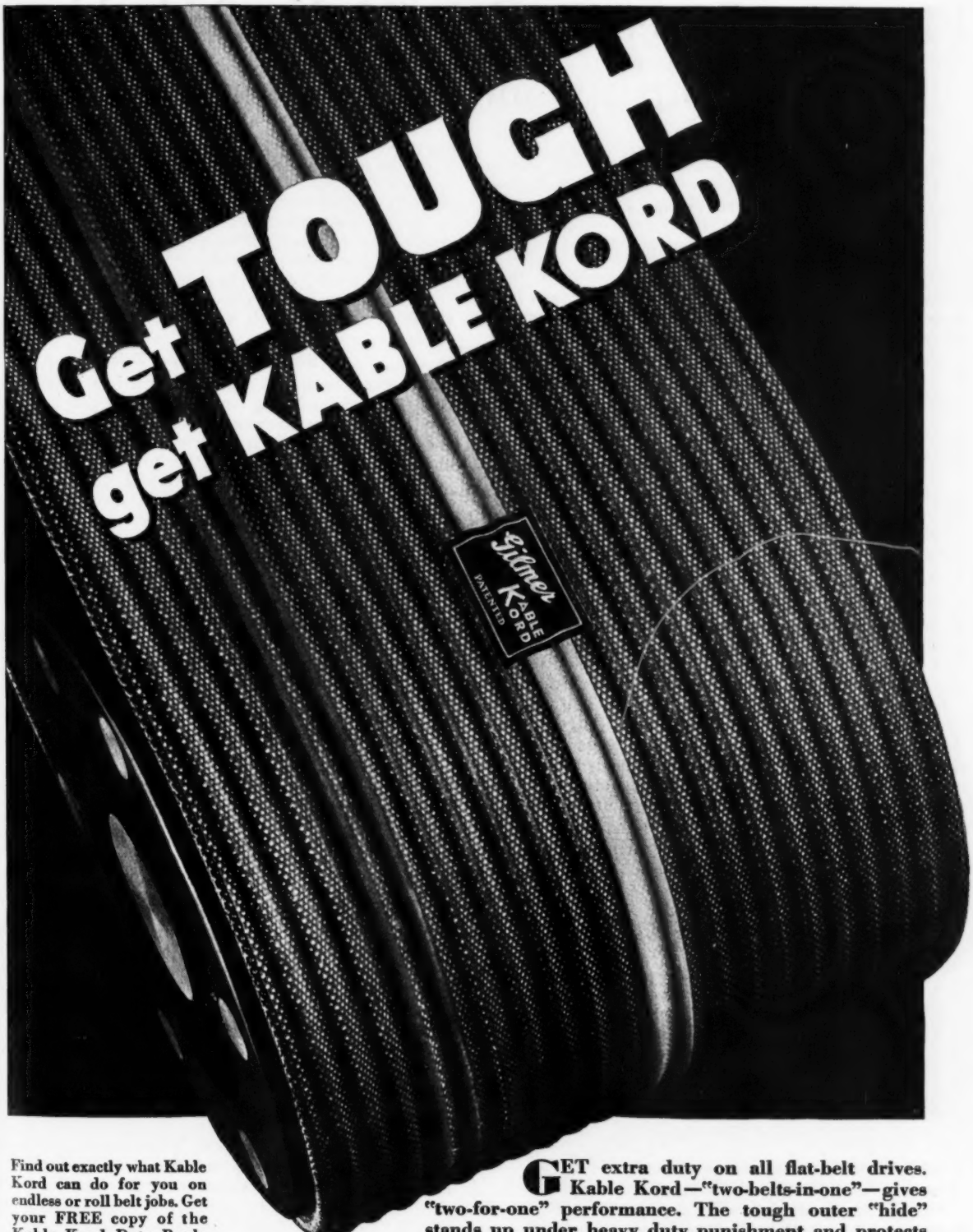
The machine will consist of screens, headbox, Fourdrinier part, suction couch roll, presses, driers, size press, calenders, reels, cutter and winder. There will also be a five cylinder wet part so arranged that the same presses, driers, and calenders may be used to handle the web formed on the cylinders. The Fourdrinier is designed to allow study of the many ways in which the formation of paper may be affected by rearrangement and interchange of parts of the Fourdrinier. This idea is carried throughout the other sections of the machine as far as is practical.

The real point is that the machine is in no sense a toy or something to be set on a laboratory table. It is a paper machine of commercial size on which it is possible to reproduce the conditions which the men studying Professor Libby's courses will meet when they go to work in the paper mills of the country.

Data discovered on this machine will have a force which laboratory data has perhaps never before carried. Paper manufacturers who send their problems to the paper manufacturing department of the New York State College of Forestry can feel sure that the answers they get, are produced under conditions, which are the same as they would create on their own paper machines.

Professor Libby has been at some pains to secure the installation of a machine which is primarily commercial in construction. The Sandy Hill Iron and Brass Works has conceived a machine which makes it possible to vary in many ways the conditions under which paper is made, and has introduced into it a number of the company's own special features.

The pulp and paper laboratories of the New York State College of Forestry are already squipped with the most up-to-date apparatus for studying and testing paper mill fibers and manufactured paper. An effort is being made to complete the installation by the early part of the second semester of this college year so that the class of 1937 may have some experience with the machine. However, future graduates of the paper manufacturing department of the forestry college will have their training as pulp and paper mill technicians rounded out by experience in the actual study of paper machine conditions, and by determining for themselves the results of varying these conditions on an operating commercial paper machine.



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Gilmer BELTS

L. H. GILMER COMPANY, Tacony, Philadelphia

Flambeau Paper Co. Rebuilds No. 2 Machine to Improve Quality and Production of Paper

The Flambeau Paper Company has announced that orders have been placed with Beloit Iron Works for new equipment to be installed on No. 2—132 inch machine, which will enable them to produce a higher quality paper.

New Type Press Section

The entire press section will be replaced with the Beloit horizontal dual press, which has only recently been introduced to the paper trade. A model of this press is shown in the photograph.

This press section consists of two presses; the first press is of the suction type and both press rolls are served by a common center roll. There are no top press rolls.

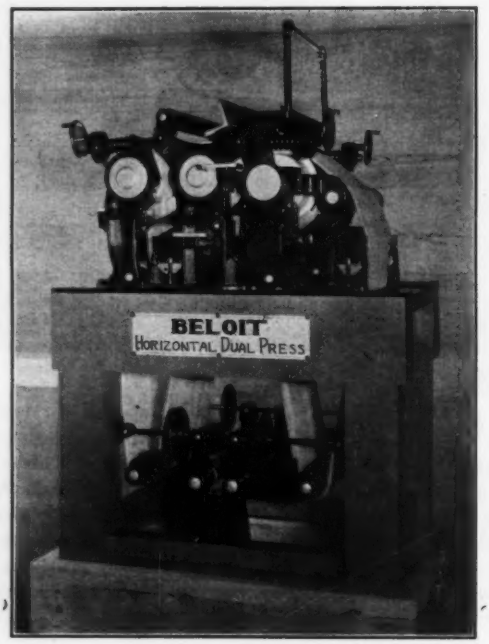
This press is equipped with tension indicator so that the operators can maintain the proper nip pressure at each press for the best results on each grade of paper.

The crowns in the press rolls are ideal for uniform water removal as it is only necessary to crown the press rolls to take care of the nip pressure and not crown the rolls to offset the deflection caused by the weight of the top rolls in the conventional manner.

Advantages of New Press

This new type press section is more efficient and the sheet leaves the press section more uniformly dry than is possible with the other type of presses. The sheet is not carried by the felt after passing through the nip; thus the sheet does not re-absorb moisture from the felt.

The suction press creates a dry nip at the first press and the water squeezed out by the second press falls away from the nip by gravity, whereas with a plain press mounted in the conventional vertical manner the water is trapped back of the nip, which limits the amount of water removal of this press and also disturbs the formation of the sheet.



All the press and felt rolls are mounted in the latest type anti-friction roller bearings.

The lower moisture content of the sheet and uniformity of moisture improves the drying of the paper without cockles and at a lower steam pressure; thus the quality of the paper is greatly improved.

To improve further the quality of the paper this machine is being equipped with smoothing rolls at the entrance of the dryer section, which will impart a better finish to the paper.

Six Additional Paper Driers

There will be six additional paper driers installed to reduce further the drying temperature and also increase the production of the machine. Four special Feeney felt driers are to be installed so that the drier felt is dried as it absorbs the moisture from the sheet, thus preventing the paper being dried from coming in contact with a wet felt. These felt driers are of considerable importance in maintaining ideal drying conditions for the paper.

The polished surfaces of the driers and calender rolls coming in contact with the paper will be maintained in proper condition by new flexible type doctors.

Winder Being Rebuilt

The winder is being rebuilt and new slitters are being installed to make better rolls of finished paper.

These improvements are in line with the progressive policy of this company to adopt new equipment and new methods to constantly improve the quality of their fine papers to serve their customers.

Huge Lumber Cuts This Winter

The cutting of timber, both for pulpwood and lumber, will be much larger in eastern Canada this winter than for years past, according to government estimates. In Quebec province some 254,348,781 cubic feet of lumber is expected to be cut by about 40,000 men, according to figures issued by the Department of Lands and Forests.

The cutting will be in charge of 2,000 jobbers at 6,600 camps in the province and more than 11,000 horses will be used to haul the timber to rivers and streams for the spring drive.

The estimated cut by regions in cubic feet follows: St. Maurice, 68,640,191; Lake St. John, 60,831,090; Temiskaming, 44,425,000; North Shore, 23,460,000; South Shore, 16,930,000; Gaspe, 16,185,000; Abitibi, 12,000,000; north of Montreal, 11,795,000; south of Montmagny, Eastern Townships, 82,500. No figures are available for the Hull or Gatineau districts.

In connection with the above it is interesting to note that the Anglo-Canadian Pulp and Paper Mills has now deposited with the Quebec Government its plans for a logging dam on Noire River, tributary to Montmorency River, in the Laurentide National Park, Montmorency County, and to construct a canal between the river and Lac des Neiges.

An extremely busy season in the forests of New Brunswick is also forecast. One estimate of the possible cut for the season is 225,000,000 feet of lumber, and other estimates go yet higher. It is also predicted that there will be a substantial increase in the cut of pulpwood.

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Functional Design of Corrugated Container Factory Aided by Use of Glass Block

Industries anxious to apply functional treatment to new factory buildings are noting the latest complete application of this principle in the corrugated container factory and warehouse recently completed for the Owens-Illinois Glass Company at Gas City, Ind., where manufacture of prescription ware is concentrated.

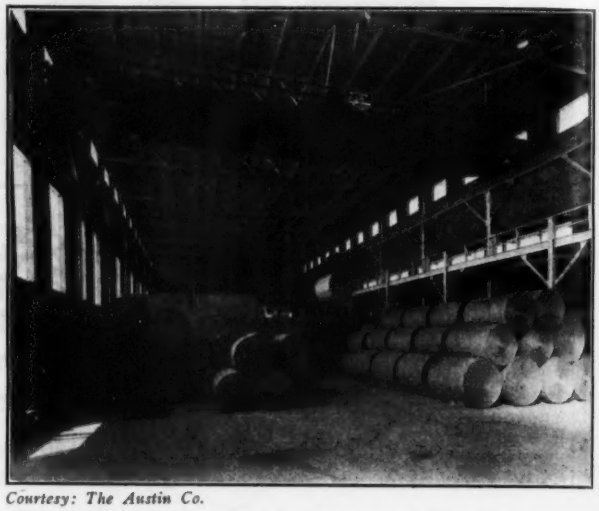
Scientific interior layout of the building—one of the largest auxiliary units ever built for the glass industry—is reflected outside by the arrangement of more than 42,000 glass blocks in panels which translate the interior plan. Laid in horizontal panels which provide streamline detail, they meet specific illumination requirements in each section of the structure, which is 541 feet long and 101 feet wide.

690 Tons of Steel Used in Structure

Six hundred and ninety tons of steel have been used in the structure, which has been built by The Austin Company. It is of steel frame and brick construction, with glass block supplanting windows. The block allows 87 per cent light penetration and acts as insulation against summer heat and winter cold, with the result that comfortable working conditions are easily and economically maintained throughout the plant.

It has been built to accommodate large stores of roll paper and the fabrication of this material into corrugated board and cartons for packing glass containers. Straight line facilities carry through the four functions for the building; paper handling and storage; corrugated board and box manufacture; warehousing and shipping.

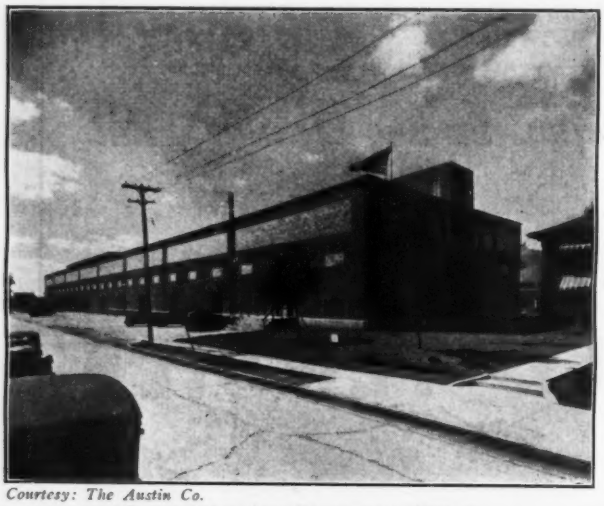
While the layout and plan of the structure sets high standards of efficiency in box production and handling, the distinguishing feature of this combined manufacturing and storage building has been its application of functional design to suit specific operating purposes. Notwithstanding the fact that the owner is also the manufacturer of glass block, panels have been restricted to the sizes justified by their location and function.



Courtesy: The Austin Co.

MODEL OF FUNCTIONAL DESIGN FOR INDUSTRY

Application of functional treatment to factory and warehouse buildings has attained a new level in the corrugated container plant and warehouse recently completed by The Austin Co. for the Owens-Illinois Glass Co., at Gas City, Ind. As many as 1250 rolls of paper, weight 2 to 2¼ tons each, can be stored at one time in this lofty storage room into which light floods through wall sections of glass block. The roll storage area, flanked on the left by a railroad siding, is served by a 5-ton electric crane which lifts roll paper to the balcony on the right. There dollies operating on 11 sets of narrow gauge track receive and carry the rolls to primary feed machines in the corrugating line. Beyond the balcony 61-ft. horizontal panels of glass block which extend along the entire 541-ft. East wall can be seen. A portion of the roll storage area was being used for the warehousing of ketchup bottles, preparatory for the ketchup season, when this photograph was taken.



Courtesy: The Austin Co.

GLASS BRICK AIDS FUNCTIONAL DESIGN

Scientific interior layout of the corrugated container factory and warehouse recently completed by The Austin Co. for the Owens-Illinois Glass Co. at Gas City, Ind., is reflected by the functional arrangement of more than 42,000 glass bricks in panels, which indicate the interior plan. Eight huge horizontal panels extending along the 541 ft. East wall admit abundant glareless daylight all along the corrugating and box production line which occupies the second floor. The panels, 61-ft. 5-inch wide and 8-ft. 7-in. high, are the largest independent exterior sections to be constructed of glass brick up to the present time. The lower course of small horizontal panels, situated at ceiling height throughout the bottle warehousing area, which extends the full length of the first floor, are arranged so as to admit necessary light in the storage area. Glass brick recessed in three towering shafts on the North elevation affords illumination for stairway and lobby, and serves as a motif for the entrance facade.

Distinguishing Architectural Feature

The eight big horizontal panels that extend along the 541-foot east wall have become the distinguishing architectural feature of the building, but their presence was dictated by the need for abundant, glareless daylight along the corrugating and box production line laid out along this wall. These panels, 61 feet, 5 inches wide and 8 feet, 7 inches high, are the largest independent exterior sections to be constructed of glass block, not excepting the new Owens-Illinois office and laboratory building at Toledo. A lower course of small horizontal panels, 7 feet, 6 inches by 3 feet, 4 inches, at ceiling height on east and west walls of the bottle storage area, is in keeping with the needs of this department, while three towering shafts of glass block ornament the entrance on the north with appropriate dignity, and furnish the necessary illumination for stairways and elevator lobbies.

Light filters into the roll storage room from the west through eighteen tall cathedral-like panels, 12 feet, 10 inches by 3 feet, 6 inches, set midway between the floor and roof trusses, and a second course of small horizontal panels admits more light from a higher point midway between the bottom chord of the roof trusses and the crane rail on the east and west walls.

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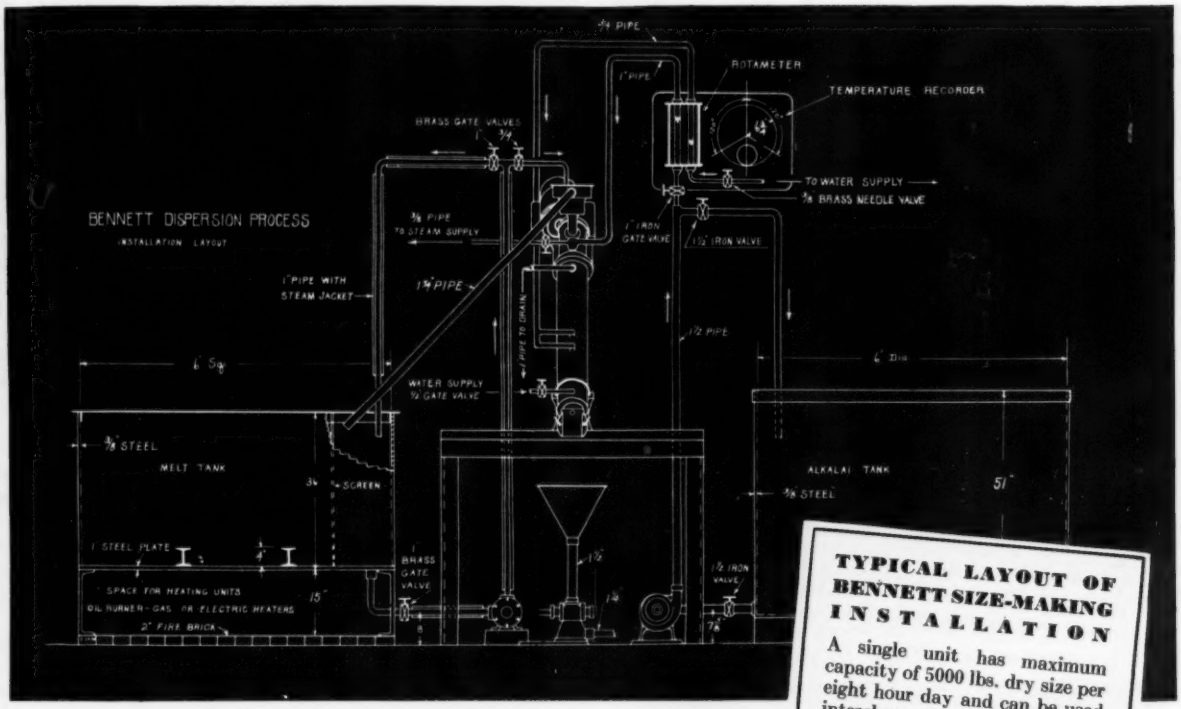

TYPICAL LAYOUT OF BENNETT SIZE-MAKING INSTALLATION

A single unit has maximum capacity of 5000 lbs. dry size per eight hour day and can be used interchangeably for the manufacture of rosin size (either neutral or high free rosin), rosin wax sizes and all wax emulsions. Uniform size is assured by continuous regulation of the flow rate of each ingredient. The unit is easily operated by one inexperienced laborer.

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ORIGINATORS OF ROSIN-WAX SIZE

All Glass Block Laid in Brick Mortar

All glass block was laid in brick mortar, somewhat richer than commonly used for ordinary brick. A galvanized 2-inch reinforcing mesh was set in the mortar at every third course and each of the glass block panels has been caulked on top and sides with oakum and sealed inside and outside with a mastic joint.

A 4-inch layer of Insulux glass wool, high in insulating and sound absorption qualities, lies underneath the roof deck in the manufacturing area and is supported by light weight metal lath. The roof deck is entirely of 2-inch yellow pine with bonded Barrett waterproofing.

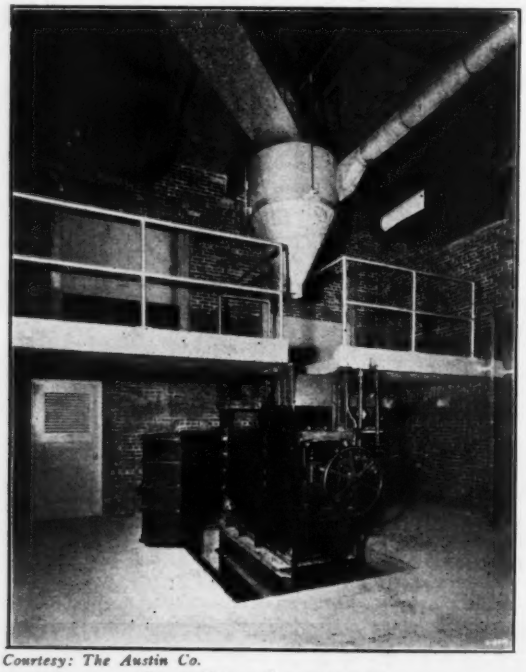
Since no provision was made for wall ventilation, a controlled system for circulation and air-conditioning has been installed. Skylights and ventilators manufactured by the H. H. Robertson Company, Pittsburgh, are used in conjunction with a system of automatic controls.

For Efficient Box Production

Roll paper delivered by freight cars to a siding installed along the west side of the building is unloaded into the roll storage area which occupies the south end of the building. With the aid of a 5-ton electric traveling crane (Whiting), the rolls are placed in sections designated for paper of each given weight and quality. As many as 1,250 rolls of 72-inch width, weighing two tons each, can be stored in this area at one time, and a special reinforced concrete floor slab, testing for a load of 3,000 pounds per square foot, has been provided. The room is also equipped with roll stops and the walls are reinforced with heavy steel beams for lateral thrust. Each of these members is set vertically and is anchored to two 1 inch by 18 inch anchor bolts and riveted to a spandrel beam which stands 12 feet above the floor level.

Roll Storage Room

The roll storage room, 204 feet long and 72 feet wide, has no intermediate columns and is spanned by welded steel trusses completely fabricated in the Austin Company's Cleveland shops. The crane operates over this entire area on crane rails set 37 feet above the floor, and transfers rolls from storage to the production line over a 10-foot second story balcony, extending 135 feet along the east side of this lofty storage room.



Courtesy: The Austin Co.

PAPER BALER INSTALLATION

A paper baler, installed in a central position underneath the box manufacturing floor in the Owens-Illinois Glass Co.'s new corrugating plant at Gas City, Ind., occupies a room 24-ft. by 31-ft. Scrap paper is drawn from the waste trim cutter in the corrugating line through a 10-in. duct seen above on the right. Other scrap drops through floor slots on the second floor to belt conveyors, which empty into the baler room on either side of the baler. An exhaust air duct, extending from the funnel shaped waste receiver directly above the baler, provides ventilation.

Eleven sets of narrow gauge track, set crosswise in the balcony and a 25-foot gallery alongside it, are equipped with dollies which receive roll paper from the crane and carry it to the primary feed machines in the corrugating line. This extends north along the gallery and paper passes through corrugating presses, pasters, a 75-foot drying oven and into cut-off shears, which slice the finished board to the desired lengths.

Continuing in the same straight line, the board passes through printing presses, slotting and scoring machines, and over folding tables to automatic machines which seal the box joints. Then the boxes move out on an automatic conveyor to tables where interior partitions are set in by hand. Ready for filling, they are then dropped on to a gravity conveyor which carries them to the ground floor for transfer either to the adjoining bottle plant where they are filled, or for shipment by rail or truck to one of the other middle-western plants of the company.

The Office

An office for the box factory superintendent and clerical employees, with glass block partitions, stands at the point where the narrow gallery opens out into the main manufacturing area, which extends across the full width of the building and measures 337 feet, 6 inches in length. Columns spaced at 22 foot, 6 inch intervals down the center of the second floor support the roof over this section.

The bottle storage area, located on the first floor, directly below the box manufacturing layout, has been divided into bays by removable shapes and is equally accessible from the railroad siding along the west side of the building and the truck loading dock on the east. Kalman floors have been installed along the passages separating the storage bays, to withstand the steady wear from industrial trucks required to transport cartoned bottles to and from storage. A spandrel beam has been placed in this section of the building at a height of 9 feet, to permit the ultimate installation of a mezzanine for storage when necessary.

As the building stands, there is some flexibility in bottle storage capacity. Roll stops can be shifted into alternate sleeves set in the concrete floor slab, to confine the roll paper storage floor and allow the use of all the space below balcony and gallery for bottle storage, as the occasion demands.

Paper Baler

A paper baler, installed in a central position underneath the manufacturing floor, occupies a room 24 feet by 31 feet in the middle of the bottle storage area, and draws paper scrap from the waste trim cutter in the corrugating line through a 10-inch duct. This duct also has a ventilating function and is connected with an exhaust air duct. Other scrap is conveyed to the baler through floor slots which empty into conveyor troughs.

Paste required for production of the corrugated board and boxes is pumped under pressure from three 10,000 gallon tanks situated in a special concrete basement direct to the machines on the second floor, and circulates through direct return lines. The basement, 67 feet by 25 feet and 18 feet high, includes a huge silicate storage pit and dissolver where the company can make its own silica glue. The basement extends alongside the railroad siding where prepared pastes or silicates can be unloaded directly into the storage tanks or bins.

First Unit of Union Bag & Paper Corp's New Kraft Plant at Savannah in Operation

By D. G. Moon, Chief Engineer, Union Bag & Paper Corp.

The Union Bag and Paper Corporation of Georgia have just recently completed and put in operation the first unit of a modern kraft pulp, paper and bag plant at Savannah, Ga.

The capacity of this first unit is arranged for 135 daily tons or more of pulp; 125 tons of kraft bag and wrapping paper, with the converting plant capable of producing twelve million bags per day. Construction work is now under way for the second unit which will more than double this capacity.

Ideal Site

The site is located two miles west of the city of Savannah and comprises 375 acres running between the Coastal Highway and the navigable Savannah River, having a frontage on the latter, of over one half a mile.

This site was originally the historic "Hermitage Plantation," settled by McAlpin some two hundred years ago. It was famous for the beauty of its colonial mansions and grounds and in fact, its picturesque setting was used by Griffith in the filming of "The Birth of a Nation" in 1915.

It is also interesting to note that in 1820 the first steel railroad was laid to Savannah, to deliver over its narrow gauge with horse drawn cars, brick made on this plantation. This fine brick can still be seen in the older buildings of the city. The original mansion, slave house and buildings of the Hermitage were sold to Henry Ford, just prior to the actual mill construction, and then carefully removed, piecemeal, for reconstruction on his plantation along the Ogeeche River, south of the city.

The mill has been built parallel and adjacent to the Savannah River, fronting a steel sheet pile dock 600 ft. long with a 26 ft. channel dredged to receive ocean going vessels and wood barges. This, with the two miles of side tracks and concrete or hard surface roads which have been built into and traverse the site, offers splendid facilities for receiving raw materials and the shipment of the finished product.

Buildings Cover Wide Area

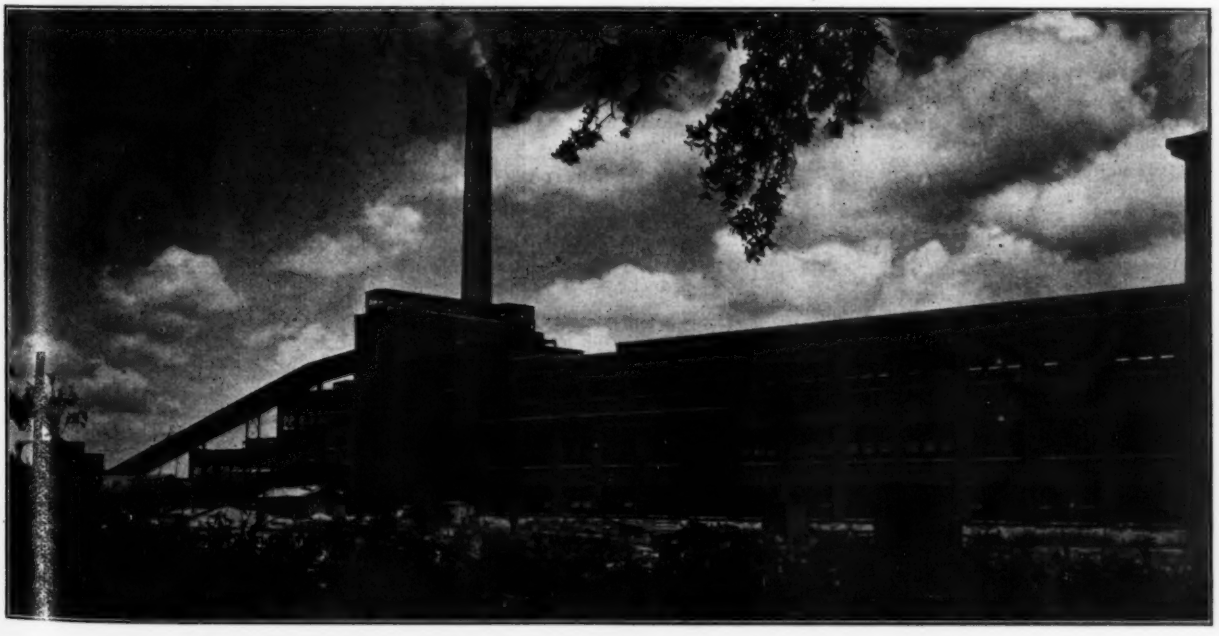
The buildings cover an area of approximately 250,000 square feet, are of reinforced concrete, brick and steel construction with steel sash, poured-in-place gypsum and cement deck slab roofs covered with a built up felt, pitched and gravel waterproofing.

The foundation was generally hard clay. About one thousand piles were used under the Machine Room and some of the heavier buildings which traverse the excavation made in the past for the old brick yard and the slough leading into the river. Some cofferdam work was necessary in dewatering the site through the slough, the drainage from the latter being ultimately diverted to the west end of the mill.

The dredge material has been deposited on the mill yard to give a uniform grade and fill over the lower ground for a wide area around the mill yard property. Approximately 100,000 cubic yards of dredging were necessary to obtain the 26 foot channel.

The Wood Yard

The graded and surfaced yard, approximately 1,000 ft. x 300 ft. is entered by new concrete and hard surface roads, parallel to side tracks and to lines of steel conveyors with traveling cross conveyors between. The main



VIEW OF MODERN KRAFT MILL OF UNION BAG & PAPER CORP. OF GA., SAVANNAH, GA.

conveyors, each 500 ft. long, deliver direct to two 10 x 30 chain suspended barking drums with a separate run of steel conveyor to the dock for delivery of wood from barges. This yard is arranged to receive wood store or handle directly to conveyors from either truck, rail or water.

The Wood Room

From the drums the wood is conveyed to the Chipper Building, which is a self-contained unit, equipped with one 88" chipper, two vibrated screens 4 x 12 and one 36" chip crusher.

The selected chips are conveyed from the wood room to the digester bin with a 24" five ply rubber belt conveyor 480 ft. long. A similar belt for carrying bark, saw dust and refuse is located underneath the chip belt—the whole being carried on a structural steel bridge.

Pulp Mill Equipment

The equipment for the pulp mill consists of four 7 ton welded steel digesters, arranged for both direct and indirect cooking, with liquor circulating pumps. With the indirect cooking, facilities are available for starting the cooking with 30 lbs. steam extracted from the main turbine and finishing with 135 lbs. steam from the same source; the switch-over in pressure as well as the air relief from the digesters being accomplished through automatic valves, adjustable to desired temperatures.

The relieved steam during the cooking operation is led through coils in the measuring tanks which are located on the operating floor of the digester to assist in maintaining as high a temperature as possible in the cooking liquors.

Twelve fusion welded diffusers located around a circular concrete chest are used for pulp washing, the digester blowing into the diffusers and then into a central trap from where the steam is carried to a jet condenser and accumulator. The contaminated condensate from the blow-off steam retained in the accumulator is then put through two spiral heat exchangers, with clean cold water entering them to absorb the heat and provide good clean heated water for the washing of the pulp and other mill uses.

The condensate from the indirect heaters is carried to a flash tank for returns as treated boiler feed and is protected with automatic alkalinity protective devices to divert it, should liquor enter the lines due to leaky tubes, etc.

The diffuser dump chest is provided with vertical agitators, the washed stock being dumped to the adjacent screen room for gravity flow through three knotters, then to three centrifical first screens with the tailings going to a centrifical second screen. The accepted stock flows to two 8 x 8 vacuum deckers which also receive the white water from both pulp and paper mill sources.

The rejects are carried to a separate chest, then over a thickener and a refiner. Concrete chests with parallel type agitators are located in the basement under the deckers for storage of the thickened stock.

Recovery System

For Black liquor storage, three 70,000 gallon tanks are provided with a filter for removing fibre before entering them. The evaporators consist of a five body quadruple effect compound in the first stage and with the vapors in the last effect condensed in a barometric multiple jet type condenser.

The condensate from the first effect is returned to the boilers and that from the following effects into a sump pit combined with the overflow from the digestor blow down condensate overflowing from the accumulator. The gases vented off in this sump pit are carried over to the recovery furnace and consumed, thus eliminating to a large extent, the obnoxious odors usually prevalent in kraft pulp mills.

The Recovery Furnaces consist of three Tomlinson type water tube waste heat boilers with water cooled black ash liquor furnaces. Each of these units are rated at 342 H.P. and are provided with an economizer and air preheater.

These boilers are provided with oil burners as well as black liquor feed and can be used co-jointly or independently of either fuel, generating steam at 450 lbs. pressure at 750° F in conjunction with the power boilers. The concentrated black liquor is delivered into mixing tanks where measured quantities of makeup salt cake can be added to the liquor before pumping to the oscillating spray nozzles of the furnace.

These boilers are provided with automatic combustion control and draft regulation. The smelt from these recovery boilers deliver into the dissolving tanks through specially constructed spouts arranged to reduce noise to a minimum.

The green liquor is treated in a continuous causticising system with provision for recovering lime by reburning in a kiln 8 ft. in diameter, 120 ft. long.

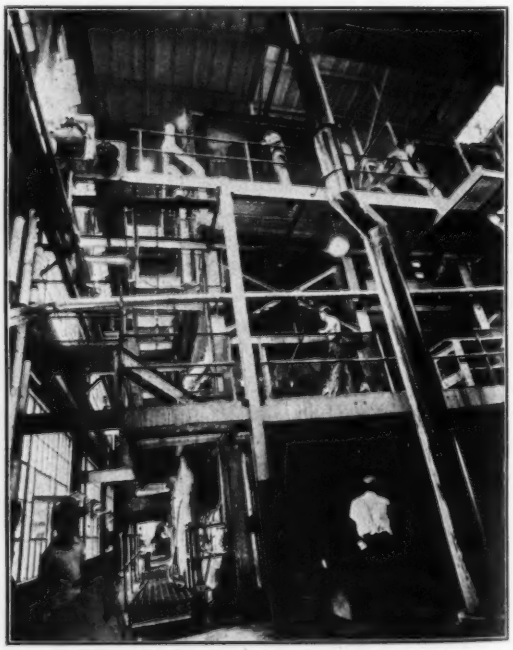
Provision for the storage of an ample supply of salt cake for delivery by boat is provided adjacent to the causticising room and the dock in conjunction also with a lime storage.

The Paper Mill

Stock is prepared with ten Majestic type Jordans which are connected to 350 h. p. synchronous motor with individual watt-hour meters. These jordans deliver into the concrete mixing chests with parallel type agitators and deliver the stock into the paper machine over four 40" Jones-Leight screens.

The machine room was laid out and constructed for two paper machines, one of which is now installed and in operation and the second to be erected shortly. The present machine is a 234" Pusey-Jones High Speed Fourdrinier of the latest design for the manufacture of kraft paper up to speeds of 1200 ft. per minute.

The machine is arranged for a 90 ft. wire and is equipped with Voith stock inlet, 26" breast roll, 10½ table rolls, 7 oscillating suction boxes, suction Couch roll, Aldrich shake and removable Fourdrinier.



RECOVERY SYSTEM

The first and second presses are of the suction roll type with a special arrangement for the third press.

The drying section consists of one 42" drier, 43 main driers each 60" in diameter, also six 48" felt driers. The drier journals run in extra heavy duty self-aligning roller bearings connected to an oil circulating system. The driving train is of the high speed enclosed type with all driers in the lower part horizontally connected by intermediate idler gears, there being four main drying pinions.

The machine is also equipped with one 8 roll calender-stack Pope type uniform speed reel and one two drum unit speed winder completely equipped with anti-friction bearings, the winder drums lead rolls and slitters being accurately balanced for speeds up to 3000 ft. per minute.

The machine drive is the latest type General Electric sectionalized individual motor drive with Selsyn control with the first drier section acting through the Selsyn as the master section for the whole. The winder is arranged with double motor drive with regenerating braking set for the unwinding roll.

The machine is equipped with a transite hood with exhaust and supply fans for conditioning the room, calender blowers and hot air blast for felt drying. For felt conditioning, the machine is provided with two 20" suction felt rolls.

Spanning the machine room for servicing both the present and future machines, there has been provided a fifteen ton five motor traveling crane with other suitable cranes for handling the reel and servicing the machine drive.

For disposition of broke and trimmings, a 64 x 36 breaker beater is provided in the basement.

Finishing Room

The equipment consists of one rewinder for 122" trim, one 124" sheet cutter and layboy and one 84" knife cutter.

A special arrangement of light trolleys, electrically operated hoists and grabs have been installed for handling bag rolls coming off of the paper machine in such a way that these rolls are loaded on skids for transportation by lift truck to the bag factory or storage for rehandling, the rolls being maintained in storage on the skids. The storage space in conjunction with the finishing room, is sufficient to take care of 1800 tons of bag rolls, etc.

Power Plant Equipment

For the generation of steam at 450 lbs. pressure at 750° F, the plant is equipped with three Sterling type boilers 478 h.p. each with air preheaters, oil burning equipment and automatic combustion control.

Two of these boilers are equipped with dutch ovens, special bins and feeders for burning the bark and refuse from the wood bin, either independently or in conjunction with oil.

Water treatment is obtained with a lime-soda process, delivering to a deariating heater and a continuous blow-down system is used.

A radial brick chimney, 12 ft. in diameter and 250 ft. high, serves both the power boiler and the Recovery Room boilers, the steam from both being combined in one header for delivery to the steam turbine.

All of the mill's power requirements are obtained from a 7500 K.V.A. 2400 V and 3600 R.P.M. automatic double extraction condensing turbo-generator with surface type air cooler. This turbine is arranged to supply steam for process requirements at 35 lb. and 135 lb. pressure in conjunction with reducing valves and de-superheaters, providing steam in excess of the turbine extraction rate for occasional peak requirements.

While raw water makeup facilities have been provided for 60 per cent of the total demand, the return of condensate coupled with the recovery of heat from the digestor blow off steam and the indirect heaters, should give a well closed heat balance.

The Auxiliary Equipment consists of two motor driven air compressors, each delivering 900 C. F. M., one motor driven and one steam driven feed water dump, Surface condenser with 4150 sq. ft. of heating surface and 4000 G. P. M. circulating pump—also one steam and one motor driven fire pump—each of 1000 G. P. M. capacity.

The main switchboard, located on the turbine room floor is of the latest cubicle type construction and is divided into sufficient panels and feeders for close recording of the departmental power consumption.

The turbine room is equipped with a 20 ton overhead traveling crane.

Water Supply

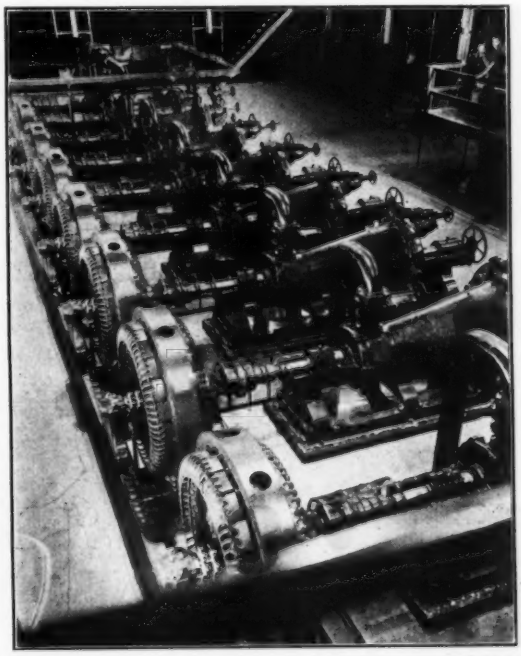
The water for circulating pumps for the turbine and evaporator condensers, fire protection, etc., is obtained from the Savannah River, through an intake protected with a traveling screen leading into a pump pit located in the turbine room, the various pumps serviced from this intake being of the vertical type. Fresh clean water for boiler feed and process requirements is obtaind from one 30" well delivering 3000 G. P. M. and supplemented by a 10" well delivering 8000 G. P. M.

The Bag Factory

For this purpose, the Diamond Match Company's building, which was already constructed on the site, was rehabilitated to give a one level floor, 197 ft. wide and 525 ft. long.

One half of this building contains the modern high speed bag machines with a Paste Preparing Room of the latest type, from which paste is pumped throughout the Bag Factory, to each individual machine.

In one end of the building there has also been located a Printing Department and many of the bag machines are equipped with presses for printing the bag directly on the machine; separate presses have also been installed for printing the bags after they are made.



BATTERY OF JORDANS

the

B&W-TOMLINSON RECOVERY PROCESS

NINETEEN

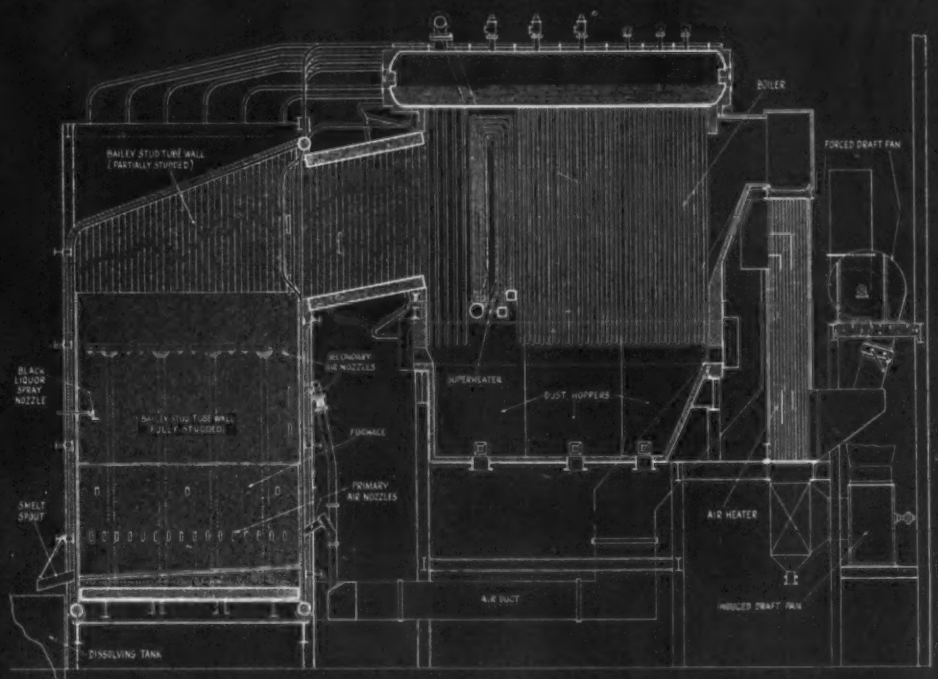
COMPLETE UNITS INSTALLED OR ON ORDER SINCE JULY, 1935

1. CHEMICAL RECOVERY
   exceeds 93 per cent.
2. CHEMICAL REDUCTION
   averages 95 per cent.
3. MAXIMUM STEAM PRODUCTION
   determined by liquor conditions and the heating surface economically justified.
4. MINIMUM LABOR REQUIREMENTS
   assuring lowest recovery-room labor-costs per ton of pulp produced.
5. LOWEST FURNACE MAINTENANCE
   carefully maintained records at Windsor Mills, Quebec covering two years of operation show furnace-maintenance costs materially less than five cents per ton.
6. MINIMUM SPACE REQUIRED
   unit of 130 tons capacity installed in space formerly occupied by 30 ton rotary unit.
7. CLEANLINESS OF OPERATION
   assured by completely enclosed gas-tight construction and controlled operation.
8. COORDINATED, SEMI-AUTOMATIC CONTROL
   assuring the sustained combustion efficiency necessary for maximum chemical recovery and reduction, as well as maximum steam production and smooth, uninterrupted operation.
9. A COMPLETE UNIT

THE MOST MODERN AND ECONOMICAL RECOVERY UNIT FOR SULPHATE AND SODA PROCESSES

Write for complete information

NUMBER 1 OF A SERIES OF ADVERTISEMENTS

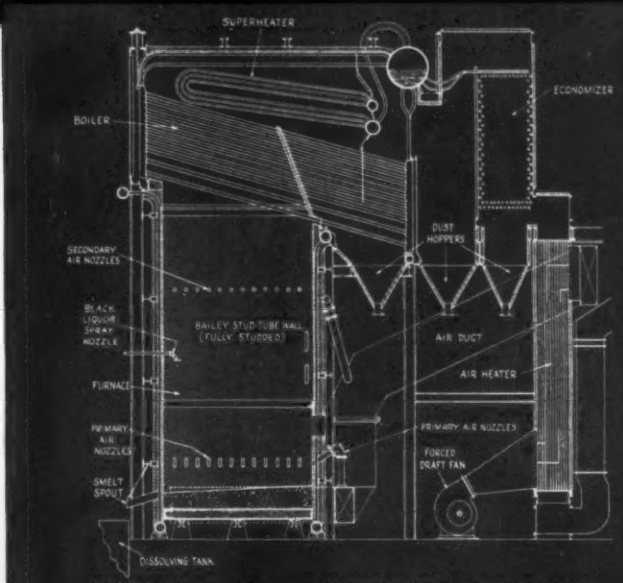


B&W-Tomlinson Recovery Unit with Bailey Fully-Studded Water-Cooled Furnace, B&W Three-Drum Boiler, Air Heater, and Spray Tower for operation with Black Liquor from Western Hemlock and Douglas Fir.

OTHER BABCOCK & WILCOX EQUIPMENT FOR THE PAPER INDUSTRY

Water-Tube Boilers	Gas Burners
Water-Cooled Furnaces	Multi-Fuel Burners
Superheaters	Seamless Steel Tubes & Pipe
Economizers	
Air Heaters	Seamless Alloy Tubes & Pipe
Coal Pulverizers	
Pulverized-Fuel Burners	Refractories
	Digesters
Chain-Grate Stokers	Diffusers
Oil Burners	Welded Pressure Vessels

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET . . . NEW YORK . . . N. Y.



B&W-Tomlinson Recovery Unit with Bailey Fully-Studded Water-Cooled Furnace and B&W Boiler for operation with Black Liquor from Southern Slash Pine.

G-92-T

BABCOCK & WILCOX

The bag rolls are received from the paper mill on skids and are unloaded from these skids with specially constructed trolleys and grabs to prevent damage to the rolls. The east half of the building is arranged for the baling, storaging and shipping of the finished bags, the bales being piled on palettes and handled by lifting fork trucks either into storage or directly into cars.

Shipping facilities are provided by an enclosed train shed running the long length of the Bag Factory Shipping and Storage Section and permit safe loading of bags and paper at all times, regardless of weather. Storage facilities for 3000 tons or more, of bags and paper, are available in this building.

Auxiliary Equipment

A modern repair and machine shop has been constructed adjoining the paper mill finishing room, and includes the latest type heavy duty lathes and drill presses, milling machines, etc., also a roll grinder of sufficient size to handle the largest roll on the paper machines. This machine shop and roll grinder section is serviced with electrically operated cranes connected to a crane extended out over the side track, for bringing in heavy materials.

Adjoining the machine shop is a mill supply storage house with electric repair shop in the basement.

The auxiliary buildings include a modern air conditioned office, with the private offices panelled in walnut; also a fully equipped laboratory and first-aid room. The paper mill buildings, bag factory and offices have full sprinkler and fire protection facilities provided throughout, with mains running into the wood yard and a centrally located tank of 60,000 gallon capacity.

Housing of Workers

The drive originally leading into the "Hermitage" Plantation with its beautiful avenue of live oaks is being adapted to a sub-division for the housing of company employees and the construction of several attractive homes is already under way. The company also plans the construction of a Golf Course, a Cafeteria and Central Club House.

Wood Supply

Large acreages of timber lands have been purchased in fee or are being taken under option to lease. In the territory surrounding Savannah many millions of acres of pulpwood are growing within a radius of 100 miles, and on the cut-over lands pulpwood will be grown most economically to the advantage of the land owner as well as the company, and it is estimated by forest engineers that there is a perpetual supply of pulpwood in the territory adjacent to the mill sufficient to cover any rational expectation in the future.

Savannah Officials Cooperate

The new plant was brought to Savannah through the combined efforts and splendid team work of the City of Savannah, its Port Authority and Industrial Commission, and the far sighted Savannah bankers who have cooperated untiringly with the Union officials.

The new plant, while owned by the parent company, is a Georgia Corporation and will use Georgia materials as far as possible in construction and when completed the principal raw material consumed will be Georgia second growth pine, thus creating a market for a product from cut-over lands which has not existed in the past.

Construction Personnel

The engineering and design as well as the supervision of construction is under the direction of George F. Hardy, consulting engineer, 305 Broadway, New York, who is represented on the ground by A. G. Ready as resident engineer.

The construction work is being carried out by the firm of Merritt-Chapman & Scott Corporation, contractors, of New York with J. T. McLellan acting as their general superintendent for the construction of the first unit. Representing the Union Bag and Paper Corporation, the development was in charge of J. H. Allen, vice-president of the Georgia Company; J. T. Gamble, general manager of mills; W. W. Anderson, assistant manager, and D. G. Moon, chief engineer.

Manufacturers of Equipment

232 inch Paper Machine, Pusey & Jones Corporation, Wilmington, Del.

Paper Machine Hood and Ventilators, J. O. Ross Engineering Company, New York.

Sectional Paper Machine Drive, General Electric Company, Schenectady, N. Y.

7500 KVA Steam Turbine, General Electric Company, Schenectady, N. Y.

Switchboard, Transformers, Motors, General Electric Company, Schenectady, N. Y.

Three 475 hp. Power Boilers, Babcock & Wilcox Company, New York.

Three Recovery Boilers, Babcock & Wilcox Company, New York.

Cable, Conduit, etc., Westinghouse Electrical Supply Company, Pittsburgh, Pa.

Cranes, Whiting Corporation, Harvey, Ill.

Trolleys and Hoists, American Monorail Company, Cleveland, Ohio.

Roll Grinder, Lobdell Car Wheel Company, Wilmington, Del.

Evaporators, Swenson Evaporator Company, Harvey, Ill.

Condensor for Evaporators, Schutte & Koerting Company, Philadelphia, Pa.

Four Paper Machine Screens, E. D. Jones & Sons Company, Pittsfield, Mass.

Ten Majestic Jordans, E. D. Jones & Sons Company, Pittsfield, Mass.

Four Digesters, 12 Diffusers, M. W. Kellogg Company, New York.

Causticizing Equipment, The Dorr Company, New York.

Sludge Filter, Oliver United Filter Company, New York.

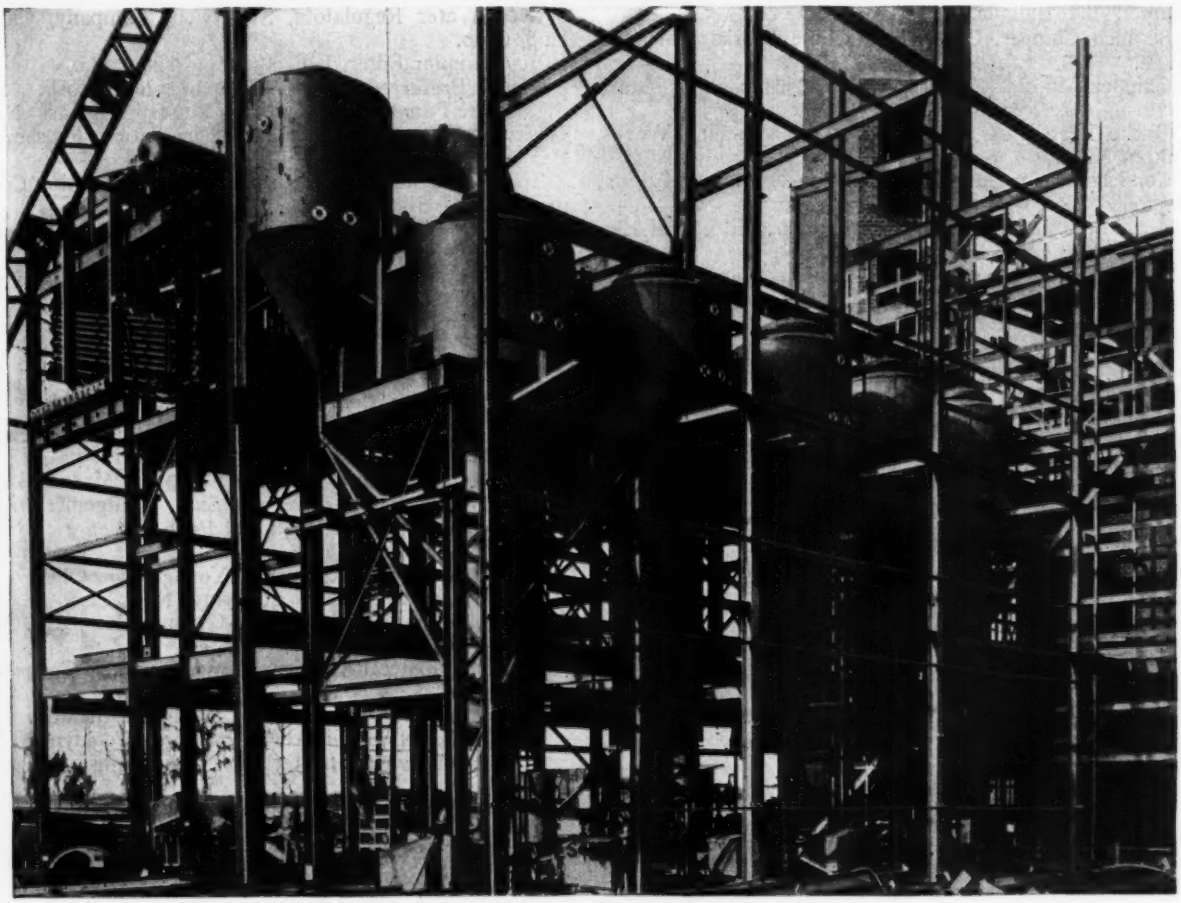
8 x 120 Lime Kiln, Vulcan Iron Works, Wilkes-Barre, Pa.

Refractories for Kiln, Quigley Company, Inc., New York.

Oil Burner for Kiln, Hauck Manufacturing Company, Brooklyn, N. Y.

DIFFUSER ROOM

SWENSON



First One Ready at Union Bag

IN addition to furnishing the black liquor evaporator at Union Bag, Swenson has the distinction of being the first equipment company to complete erection of its unit.

In selecting Swenson equipment pulp mill managers are not only assured of the latest in design, but also of prompt shipment and complete service in the field.

The Union Bag installation incorporates the latest improvements in kraft and soda mill operation. It is typical of what may be achieved by coupling research with practical experience. That is why so many of the big mills take Swenson as the answer to their black liquor recovery problem.

Swenson also offers a complete line of rotary vacuum filters, including lime sludge filters, pulp thickeners, deckers, bleach washers, etc.

SWENSON EVAPORATOR COMPANY
(division of Whiting Corporation.)
15687 Lathrop Avenue, Harvey, Illinois

EVAPORATORS
FILTERS — CRYSTALLIZERS

Scales, Kron Company, Bridgeport, Conn.

Vacuum Pumps, Roots-Connersville Blower Company, Connersville, Indiana.

88 inch Chipper, Carthage Machine Works, Carthage, N. Y.

Chipper Motors, 150 hp., Electrical Machinery Manufacturing Co., New York.

Broke Beater, 64 x 36 inches, Dilts Machine Works, Fulton, N. Y.

Condensate System, Paper Machine, Midwest-Fulton, Dayton, Ohio.

Elevator Finishing Room, Westinghouse Electrical Elevator Company, Pittsburgh, Pa.

Two Barking Drums, 10 x 30, Fibre Making Process, Inc., Chicago, Ill.

Diffusers Room Equipment, Fibre Making Process, Inc., Chicago, Ill.

Four Indirect Heaters, Fibre Making Process, Inc., Chicago, Ill.

Digester Glow Condensor, Fibre Making Process, Inc., Chicago, Ill.

Digester Control Meters, Taylor Instrument Company, Rochester, N. Y.

Two Chip Screens, 4 x 12 inches, W. S. Tyler Company, Cleveland, Ohio.

36 inch Chip Crusher, Waterville Iron Works, Waterville, N. Y.

Intake Screen, Link Belt Company, Chicago, Ill.

Three Knotters, 4 Screens, Improved Paper Machinery Company, Nashua, N. H.

Two 8 x 8 feet Deckers, Improved Paper Machinery Company, Nashua, N. H.

One Refiner, Bauer Bros. Company, Springfield, Ohio.

Two Air Compressors, Hardie-Tynes Manufacturing Company, Birmingham, Ala.

Felt Conditioning Rolls, Downingtown Manufacturing Company, Downingtown, Pa.

Power Boilers, Combustion Controls and Meters, Smoot Engineering Company, New York.

Recovery Combustion Controls and Meters, Bailey Meter Company, Cleveland, Ohio.

Stock Pumps, Goulds Pumps, Inc., Seneca Falls, N. Y.

Lime, Soda Water Softener, Permutit Company, New York.

Agitators, Dilts Machine Works, Fulton, N. Y.

Conveyors, Stephens-Adamson Manufacturing Company Aurora, Ill.

Conveyor Belt, U. S. Rubber Products Company, New York.

Conduit and Pipe, Youngstown Sheet and Tube Company, Youngstown, Ohio.

Radial Brick Stack 12 x 250, M. W. Kellogg Company, New York.

Flues and Uptakes, Steel Products Company, Savannah, Ga.

Sprinkler System, Crawford, Slaten Company, Atlanta, Ga.

C. I. Pipe, U. S. Pipe and Foundry, Burlington, N. J.

Hydrants and valves, A. P. Smith Manufacturing Company, East Orange, N. J.

Insulation, Walker-Jamar Company, Chicago, Ill.

Special Valves and Piping, Crane Company, Long Island City, N. Y.

Consistency Regulators, Trimbley Machine Works, Glens Falls, N. Y.

30 inch Well and Pump, Layne-Atlantic Company, Norfolk, Va.

General Piping, Crawford-Slaten Company, Atlanta, Ga.

122 inch Rewinder, Cameron Machine Company, Brooklyn, N. Y.

124 inch Cutter and Layboy, Hamblet Machine Company, Lawrence, Mass.

Feed Water Regulators, Swartwout Company, Cleveland, Ohio.

Black Liquor Filter, J. E. Malone, Bristol, Va.

Tanks, Preferred Utilities Company, New York.

Pressure Pump, Quimby Pump Company, Newark, N. J.

Chemical Feed Boilers, Hagan Corporation, Pittsburgh, Pa.

Lift Trucks and Skids, Automatic Transportation Company, New York.

Air-Conditioning, Office, York Ice Machinery Company, Brooklyn, N. Y.

Laboratory Equipment, Wachtel's Physician Supply Company, Savannah, Ga.

Office Equipment, Myrtle Desk Company, High Point, N. C.

Tube Turns, Tube Turns, Inc., Louisville, Ky.

Construction Material

Structural Steel, Jones & Laughlin Steel Corp., Pittsburgh, Pa.

Brick, Standard Brick and Tile Company, Macon, Ga.

Gravel, Roquemore Gravel and Slag, Montgomery, Ala.

Cement, Lone Star, Lehigh and Penn Dixie.

Sand, J. W. Fitzgerald, Savannah, Ga.

Sash, Truscon Steel Company, Youngstown, Ohio.

Paint, Sherwin-Williams Company, New York.

Gypsum Roof, Lathrop-Hodge-Gypsum Company, Cincinnati, Ohio.

Roof Tile, Federal American Cement and Tile Company, New York.

Glass, Pittsburgh Plate Glass Company, Pittsburgh, Pa.

Putty, Belknap, Moran Allen Company, Brooklyn, N. Y.

Wire Mesh, American Steel and Wire Company, Cleveland, Ohio.

Roofing, Walker-Jamar Company, Chicago, Ill.

Steel Erection, Steel Erectors, Inc., New York.

Pipe Rail, Vulcan Rail and Construction Company, Maspeth, L. I., N. Y.

Sprinklers, Crawford-Slaten Company, Atlanta, Ga.

Rehabilitation Steel, The Austin Company, Cleveland, Ohio.

Dredging, Park-Hill Dredging Company, Jacksonville, Fla.

Roads, Espy Paving and Construction Company, Savannah, Ga.

Grating and Treads, American Abrasive Metal Company, New York.

Whippany Installs Modern Steam Unit

The Whippany Paper Board Company has recently completed the installation of a modern high efficiency steam generating unit. The unit selected was manufactured by the Riley Stoker Corporation and has a capacity of 66,000 pounds of steam per hour.

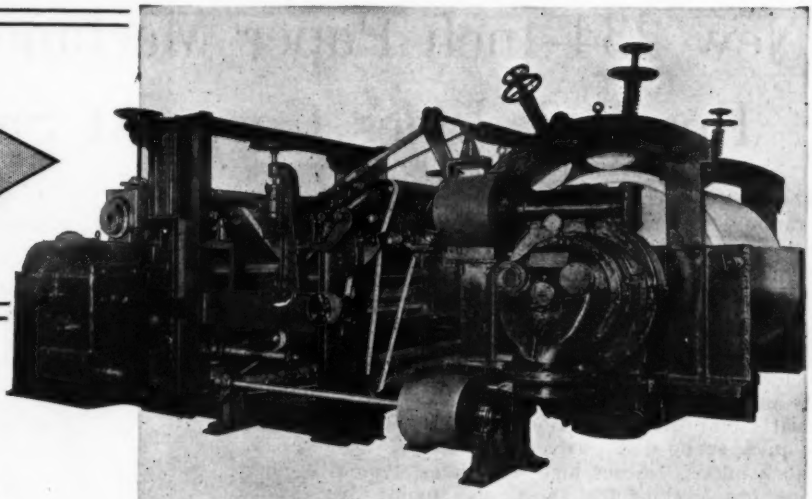
The unit consists of a 770 horse power boiler, water cooled furnace containing 700 sq. ft., and integral economizer of 3,200 sq. ft. The boiler furnace is 13'-6" wide by 15'-10" long.

Steam is generated at 175 lbs. pressure at an efficiency of 85 per cent.

The unit is fired by Riley Unit pulverizers, direct-connected to Riley burners.

Initial operation of the unit indicates tremendous savings in the cost of steam generation entirely justifying the installation of the modern equipment. These savings are of such magnitude as to return the investment over a period of three or four years.

IMPCO

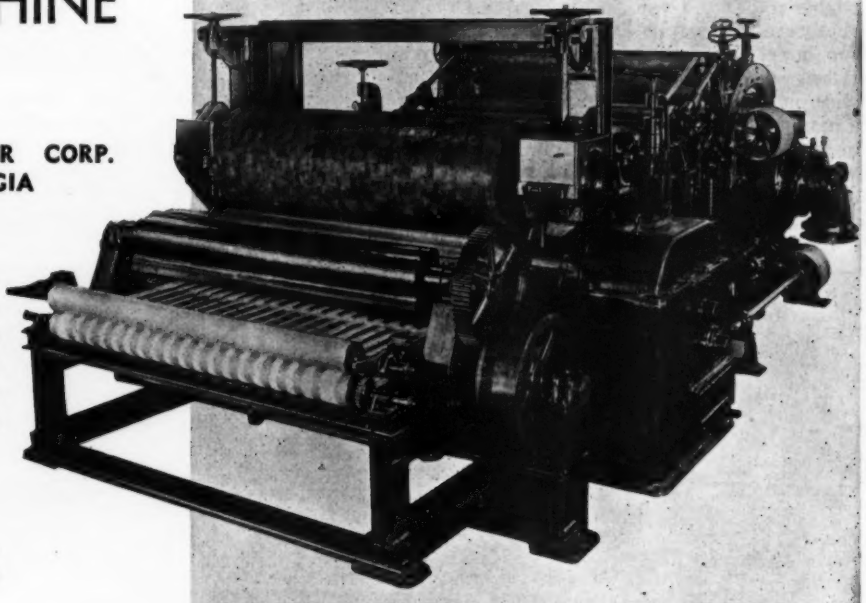


Showing Two Views
of the Modern IMPCO

HYDRAULIC WET MACHINE

Installed In
Mill Of The

UNION BAG & PAPER CORP.
SAVANNAH, GEORGIA



These new IMPCO Hydraulic Wet Machines feature enclosed cut gear drive —vacuum wet end with press rolls. They provide high density of stock with large tonnage.

Write for detailed description, construction features and operating data.

Centrifugal Screens — Vacuum Filters — Flat Screens — Dunbar Drive — Cylinder Moulds — Thickeners — Washers — Pneumatic Savealls—Cylinder Machines—Special Machinery

IMPROVED PAPER MACHINERY CORPORATION

Nashua, New Hampshire

New 234-Inch Paper Machine Installed By Pusey & Jones Corp. At Savannah Mill

The new 234-inch paper machine recently placed into operation at the mill of the Union Bag and Paper Corporation of Georgia, in Savannah, Ga., was installed by the Pusey & Jones Corporation, of Wilmington, Delaware. Brief specification of the machine follows:

The Flow Box

Flow Box of latest streamlined design constructed with structural steel supporting frame work, stainless clad steel ends and cypress bottom and partitions; equipped with special motor driven distributor roll, adjustable baffles and quick acting dump valve.

Stock inlet 60 inches high with latest type adjustable device for leveling the sheet, also motor driven distributor roll.

The Fourdrinier Part

Fourdrinier part arranged for wire 234 inches wide, 90 feet long; 40 inches diameter suction couch roll having cantilever attachment to facilitate handling wires also rubber covered top pressure roll; rubber covered steel tube table rolls fitted with special water reflectors; Monel cased return wire rolls; brass shell breast roll; seven suction boxes having Puseyjones improved motor driven oscillating device providing a combined crosswise and endwise movement of each box; improved removable type wire handling arrangement in combination with pitch adjustment and high speed shake, with motor driven Puseyjones adjustable shakehead; table rolls and breast roll equipped with Timken bearings, all other rolls with SKF bearings. All parts where exposed of bronze or stainless steel.

The Press Part

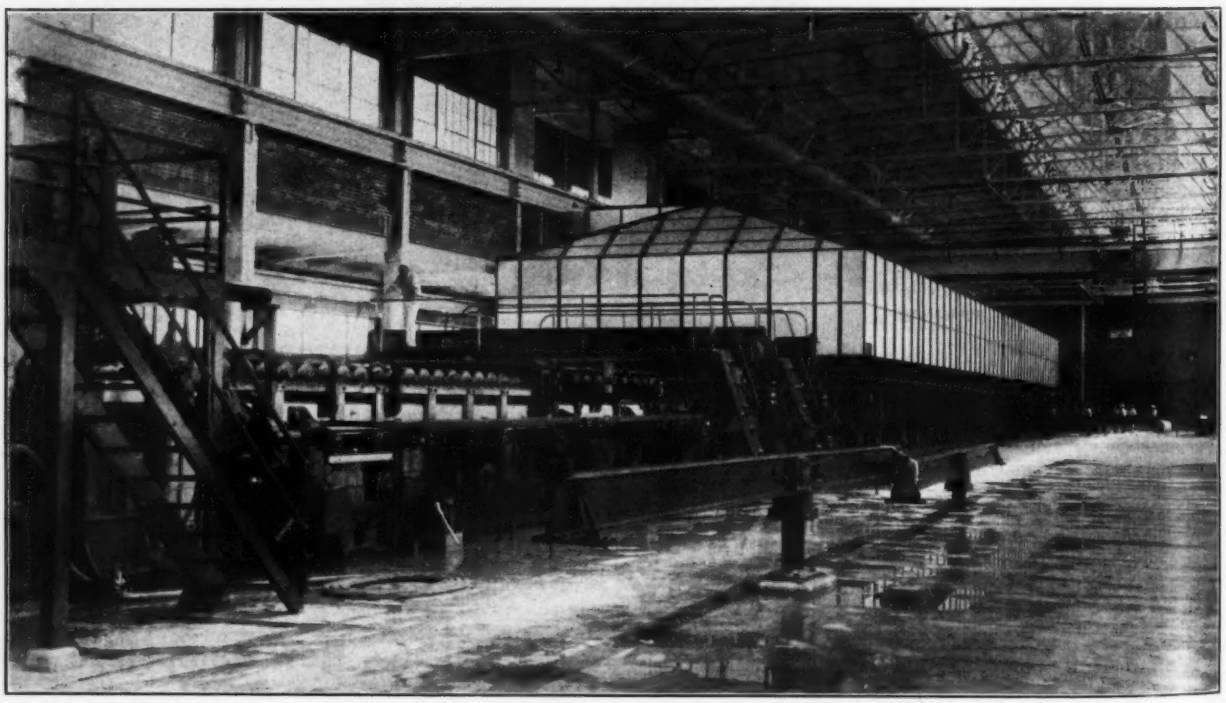
Press Part arranged with two 34 inch diameter bronze shell suction press rolls in combination with rubber covered upper press rolls; rubber covered steel tube felt rolls; motor operated basement stretchers; automatic and hand adjusted guides; 20 inch diameter suction roll on each felt; brass tube paper carrying rolls; press housings equipped with motor lift for upper rolls and quick releasing pressure device.

All paper and felt carrying rolls, felt suction rolls, also top main press rolls equipped with SKF bearings; main suction press rolls equipped with Messinger Bearings.

The Dry Part

Dry Part comprising forty-three—60 inch diameter main drying cylinders, 42 inch diameter receiving drier and six 48 inch diameter felt driers arranged in two sections with a combined smoothing and marking press between the sections. Complete equipment of felt carrying rolls, automatic and hand adjusted guides, and automatic motor operated felt tension adjusters for each of the four drier felts. Rope feed for threading the sheet through the drier sections and smoothing press. Improved oilless pressure sealing type steam joints in connection with latest type internal siphon device. Puseyjones special arrangement of drier gearing totally enclosed in the drier frames Latest design Bowser pressure feed lubricating system for the main drier bearings and enclosed gearing.

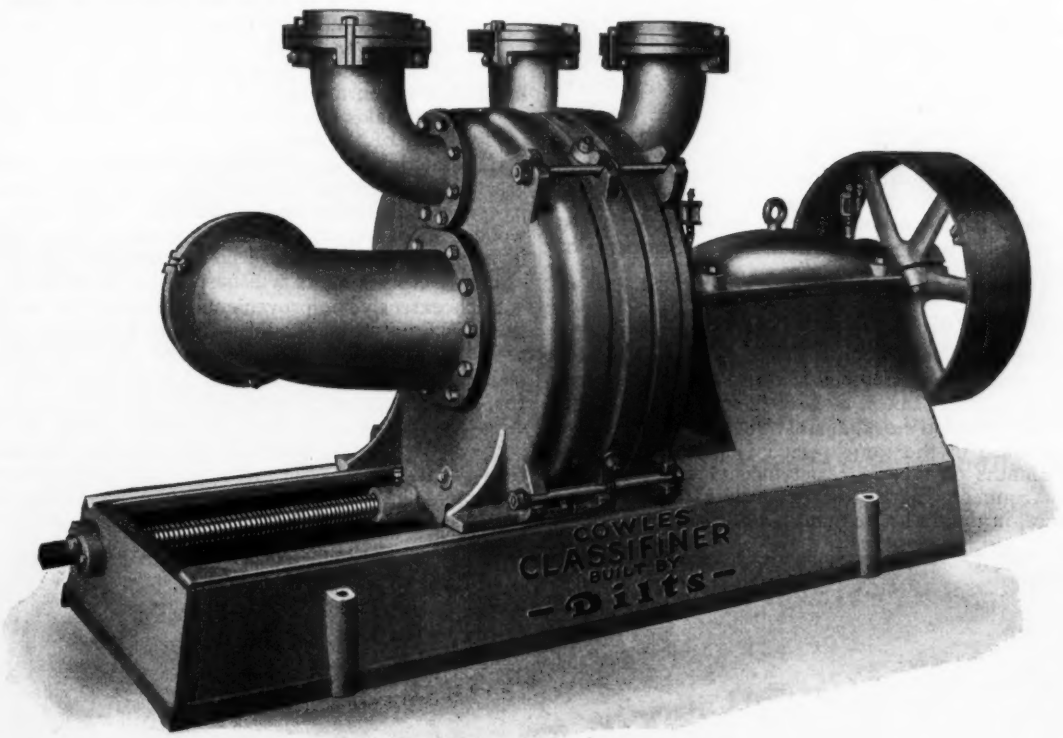
All drying cylinders, gearing and felt rolls equipped with SKF roller bearings, the front side drier bearings specially mounted so as to permit expansion and contrac-



VIEW OF 234-INCH PUSEY & JONES FOURDRINIER FROM WET END

We Again Point to the **Classifiner**

The most outstanding development for treating old paper stock in recent years.



It defibers — refines — screens.

It rejects trash — cellophane — rubber bands — excelsior — metal — glass — paper clips and dirt.

All this at an expenditure of six to seven tenths H. P. per ton of paper.

Cleaner paper — less wear on Jordans — longer felt life — Better formation — Better drying.

A Cowles Classifiner in combination with a Dilts Breaker Beater makes the most modern equipment obtainable for this service.

Fifteen successful installations in the past year

-Dilts-

MACHINE WORKS Inc. FULTON, N.Y.

"Your Paper is Made in Your Beaters"

tion of the drying cylinders without excessive thrust on the bearings or drier frames.

Smoothing and marking press comprising 32 inch diameter rolls, lower roll rubber covered, upper roll bronze cased, equipped with roller bearings, motor operated upper roll lift and drive for upper roll.

One stack of calenders containing eight rolls, bottom roll 32 inch diameter, upper rolls 20 and 16 inch diameter, equipped with flexible ductors, motor lift and improved bearings with pressure lubrication.

Improved type Pope uniform speed reel equipped with adjustable spreader. Main drum, also reeling drums equipped with SKF roller bearings.

Slitter and Winder

Slitter and Winder of special high speed design for handling bag rolls equipped with motor operating discharging and dumping mechanism for the finished rolls. One set of back stands with dynamic braking tension device. The two main drums, paper carrying rolls, pressure rider roll, slitter units and all moving parts completely equipped with SKF bearings.

All running parts of the machine constructed and tested for a maximum operating speed of 1400 F.P.M. which is obtained by means of the latest sectionalized motor drive furnished by General Electric Company of Schenectady, N. Y.

Sutherland Paper Co. Makes Good Report

The Sutherland Paper Company reports as follows for the three months ending September 30: Net income, after expenses and normal taxes, $227,604, equal to 79 cents a share on the common stock, against $182,281, or 63 cents a common share in the same period last year. For the first nine months of this year, net income was $621,807, or $2.17 a common share, compared with $472,441, or $1.64 a share, in the first nine months of 1935.

Hollingsworth & Whitney Improvements

Several months ago it was announced that Hollingsworth & Whitney Company had completed an extensive four year plan of mill improvements. The installations included the most modern and efficient equipment known to the industry. At that time it was mentioned an additional improvement program was under consideration and there would be no slackening in the drive for superior papers.

Work is to be started shortly on further improvements, which when combined with those recently completed should mean a mill system well adapted in every way to meet the most exacting requirements of today's markets.

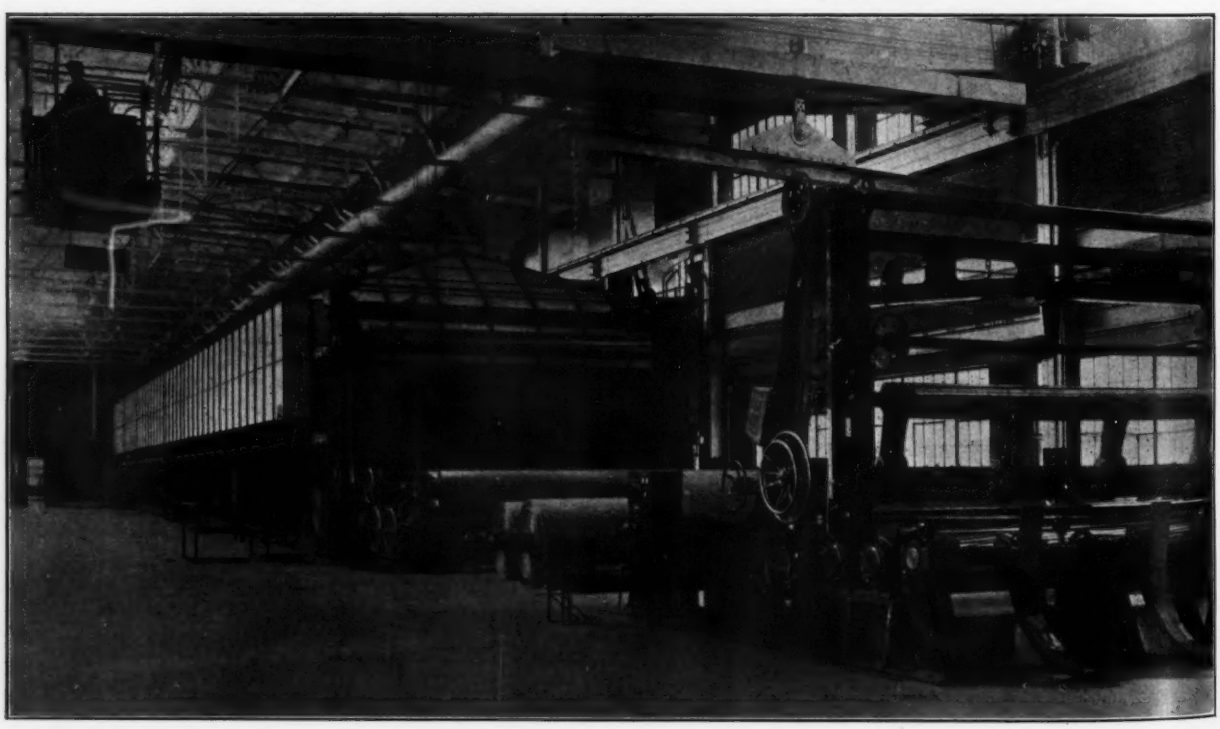
A new method of preparing stock is creating considerable interest. This is expected to result in paper of increased strength and excellence of formation, as well as affording a closer control of stock characteristics.

A major rebuilding program is under way in the paper machine division to supplement the skill and ability of H. & W. papermakers in manufacturing a product even surpassing that of the past.

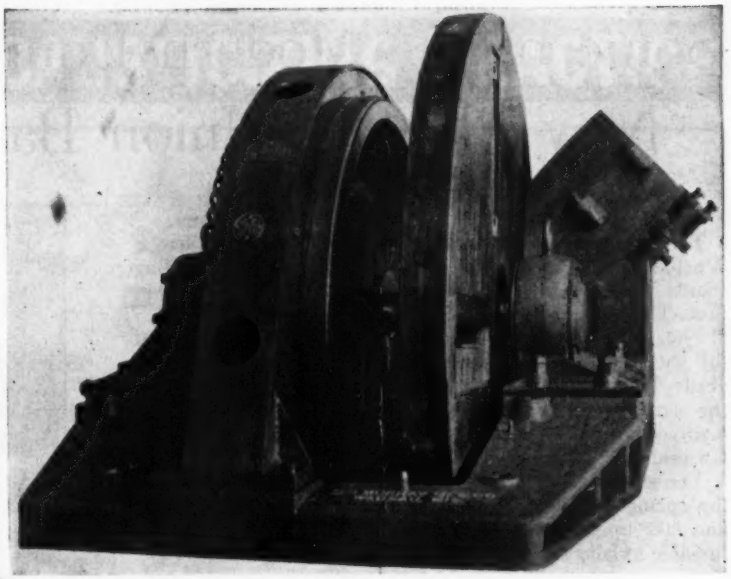
Constructive work in this department will result in a greater machine flexibility for producing the highest quality papers of many types. Sulphite, kraft, and ground wood content papers, as well as manilas, tags, index and high quality specialties will be benefited directly;—a wide range of basis weights will be possible as well.

Such extensive improvements, when added to those of the past four years, should result in the highest of standards. The established reputation of the H. & W. papermaking staff needs no comment. A new excellence is looked for, particularly in the characteristics of formation, finish, strength, opacity and a close adherence to basis weights.

Credit is due this hundred year old New England concern for its progressive ideas and determined efforts that customers shall have at all times the finest papers that experience, skill and the most modern equipment can offer.



VIEW OF 234-INCH PUSEY & JONES FOURDRINIER FROM DRY END



SKF-EQUIPPED
BUILT BY
D. J. MURRAY
MFG. CO.

SKF *Bearings on direct-connected chippers* ASSURE UNIFORM CHIPS

There is no problem in producing uniform chips, saving power and floor space and maintaining the original air gap on this Murray direct-connected chipper. For SKF Bearings are on the shaft supporting the rotor and the steel disc.

"On a recent 82-hour test, chipping 1062 cords, the power consumption was 3.92 KW per cord," says a user. "Our power consumption with the belt drive was about 6 KW per cord." Profits keep company with high production standards wherever you find SKF.

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.

3697

SKF
BALL & ROLLER BEARINGS

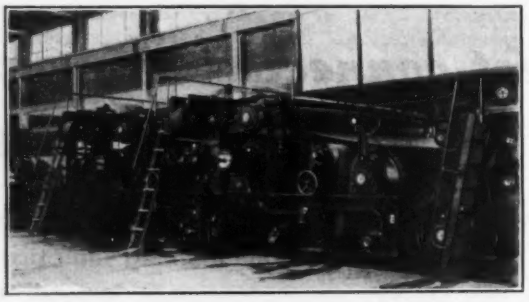
Some of the Modern Equipment Installed at New Plant of Union Bag & Paper Corp.

Downingtown Suction Felt Rolls

The Downingtown Manufacturing Company built the World's Largest Suction Felt Rolls for the new Union Bag Plant. These rolls are 20 inches diameter x 244 inches face. They are carried on anti-friction bearings.

The rigid cast iron suction boxes are carried inside of the shell heads. The packing strips are made of special grade Micarta and are supported on springs which keep the strips in contact with the shell. The deckles are also made of Micarta and are adjustable endwise while the roll is running.

The suction box is adjustable vertically in order to keep the springs supporting the packing strips in compression and take up the wear on the strips. The suction box is adjustable axially through 360° while roll is in operation. The



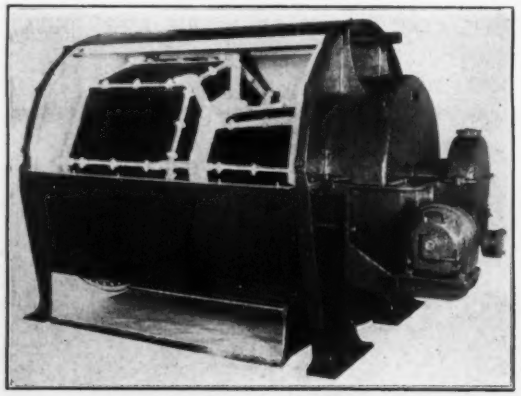
SHOWING DOWNINGTOWN SUCTION FET ROLLS

suction can be taken out of either or both ends of the roll. These rolls require no drive. Each roll weights 6200 pounds.

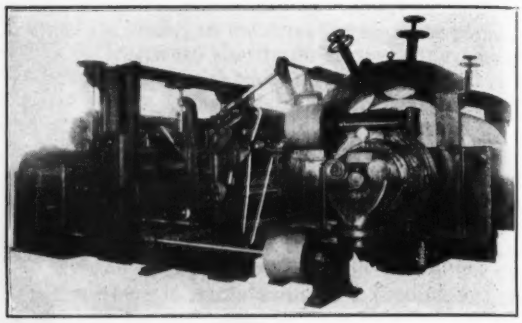
Improved Paper Machinery Corp.

The knotters, centrifugal screens, vacuum thickeners and tailings thickening equipment for the new Union Bag mill at Savannah, Ga., were furnished by the Improved Paper Machinery Corporation, Nashua, N. H. The above equipment comprises the Screen Room.

Three Standard "IMPCO" knotters were installed. Two of these machines are capable of handling considerably more than the rated capacity of the mill which is one hun-



NEW KNOTTER WITH INTEGRAL WORM DRIVES



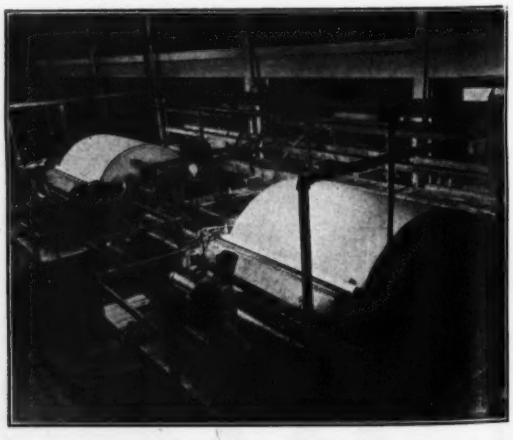
WET MACHINE WITH VACUUM WET END

dred and twenty-five tons so that the third is available as a spare unit. Each motor has a separate motor driven reducer and the actual power required is less than one hp. per machine. Each knotter motor is fed from an individual head box by means of which the screen room operator regulates the flow of stock and water through the screening system. The knotters are arranged above the screens and the screens in turn above the thickeners so that the operator can regulate the stock flow very conveniently at the knotters and at the same time watch the operation of the other equipment namely the screens and the thickeners.

The stock flows from the accepted stock flume below the knotters to three "IMPCO" design Four Centrifugal Screens. For the one hundred and twenty-five tons two of the screens operated with the third as a spare. Each screen is equipped with a 40 hp. motor and V-belt drive. Tests have shown that each of the screens has a capacity up to 75 tons.

A fourth "IMPCO" design Four Centrifugal Screen is equipped with a 25 hp. motor and handles the tailings from the first two screens.

The stock from the screens flows to two 8 x 8 feet "IMPCO" vacuum thickeners. These machines were installed both to thicken the stock and also to serve as a save-alls for the paper machine white water, using the

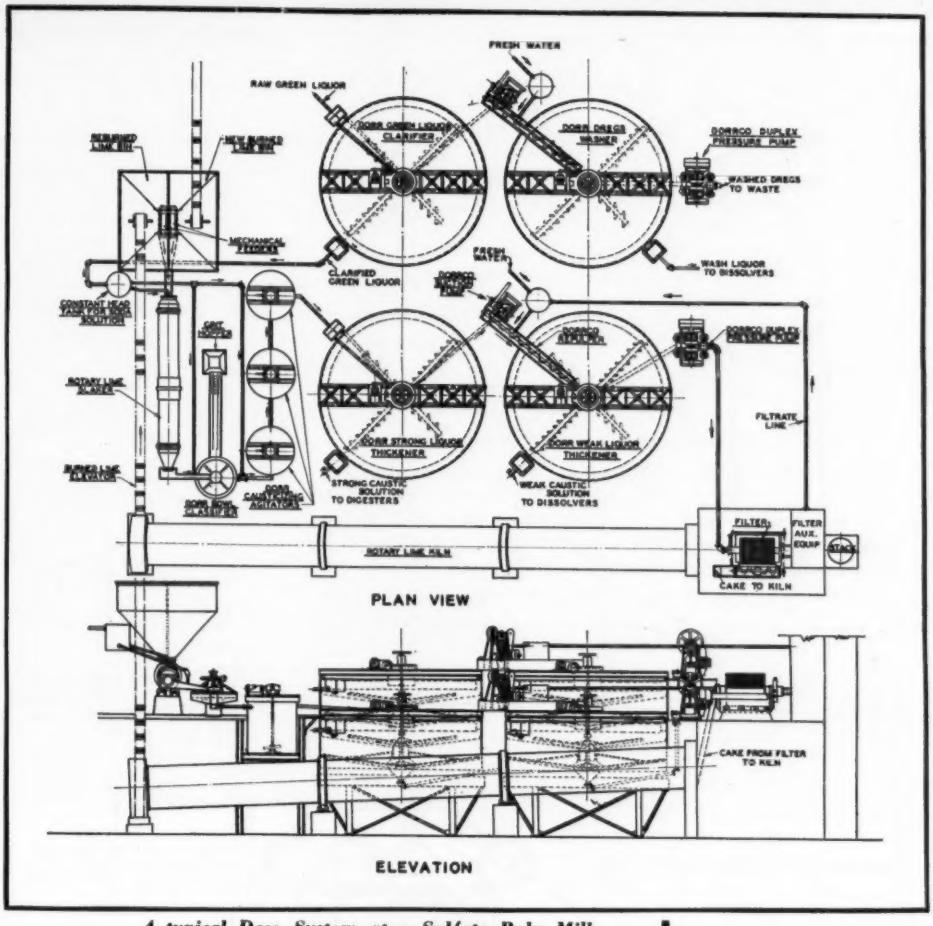


THICKENERS

STANDARD RECAUSTICIZING PRACTICE

Some Users of the Dorr System

Bogalusa Paper Co.
Brown Paper Mill Co., Inc.
Canadian Cellulose Co., Ltd.
Cellulose de Pin
Champion Fibre Co.
Chesapeake Corporation
Crown Willamette Paper Co.
Longview Fibre Co.
Marma Pulp & Paper Co.
Oxford Paper Co.
Pacific Mills Ltd.
St. Helens Pulp & Paper Co.
St. Regis Kraft Co.
Southern Kraft Corp.
Thilmany Pulp & Paper Co.
S. D. Warren Co.
Union Bag & Paper Corp.



A typical Dorr System at a Sulfate Pulp Mill.

A practice may be said to have become standard when a majority of the recently-built mills employ it—when the users are concerns of recognized standing—and when the tonnage handled attests a demonstrated performance record.

The Dorr Continuous Recausticizing System is the choice of most new soda and sulfate mills. Its list of users is impressive. And the 3600 tons of installed pulp making capacity attests a reliability that must be deserved.

DORRCO

Let us figure the savings of such a system under your own particular conditions.

Processing Steps in The Dorr System

1. Lime Slaking
2. Milk of Lime Degritting
3. Recausticizing
4. Decantation
5. Mud Washing
6. Mud Filtration

THE DORR COMPANY INC.

ENGINEERS • 570 Lexington Ave., New York

CHICAGO • TORONTO • DENVER • LOS ANGELES • ATLANTA

DORR TECHNICAL SERVICES AND EQUIPMENT ARE AVAILABLE FROM THE FOLLOWING COMPANIES:

HOLLAND: Dorr-Oliver N. V. The Hague
FRANCE: Soc. Dorr-Oliver, Paris
GERMANY: Dorr Gesellschaft, m. b. H. Berlin
ENGLAND: Dorr-Oliver Company Ltd., London
AUSTRALIA: Crossle & Duffy Pty. Ltd., Melbourne
SOUTH AFRICA: Edward L. Bateman Pty. Ltd., Johannesburg
JAPAN: Andrews & George Co. Inc., Tokio
ARGENTINA: Luis Fiore, Buenos Aires
BRAZIL: Oscar Taves & Co., Rio de Janeiro

screened stock as a sweetener. Either of these thickeners at speeds somewhat higher than normal is able to handle the total mill tonnage plus the paper machine white water.

This leeway in capacity provides for continuous operation even though it were necessary to shut down one thickener.

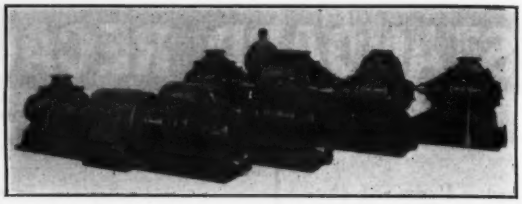
The rejects from the knotters and screens are sluiced to a 36 x 84 inches "IMPCO" slasher type thickener which is motor driven through a worm reducer. This machine thickens the reject preliminary to the refining system. The screen room layout was made by George F. Hardey.

On satisfactory operation of the above screen room equipment a second unit was ordered including knotters, centrifugal screens and thickeners of the same specifications as the original equipment. An additional three "IMPCO" flat screens with Dunbar drive were purchased to screen the finer tailings.

There is also being installed a special three roll hydraulic wet machine with a vacuum wet end for drying and cutting into sheets approximately 60 tons per day. This machine is designed to discharge at 50 per cent air dry consistency.

Roots-Connersville Vacuum Pumps

Vacuum pumps for the suction rolls, flat boxes, and felt conditioners at this new plant are of the rotary cycloidal type, manufactured by the Roots-Connersville Blower Corp. of Connersville, Ind. Seven pumps will be used, five size 12 x 18 inches, and two size 10 x 15 inches.



ROOTS-CONNERSVILLE VACUUM PUMPS

There are three duplex units, consisting of a vacuum pump at each end of the base, with a double shafted motor between them, while one is a single unit.

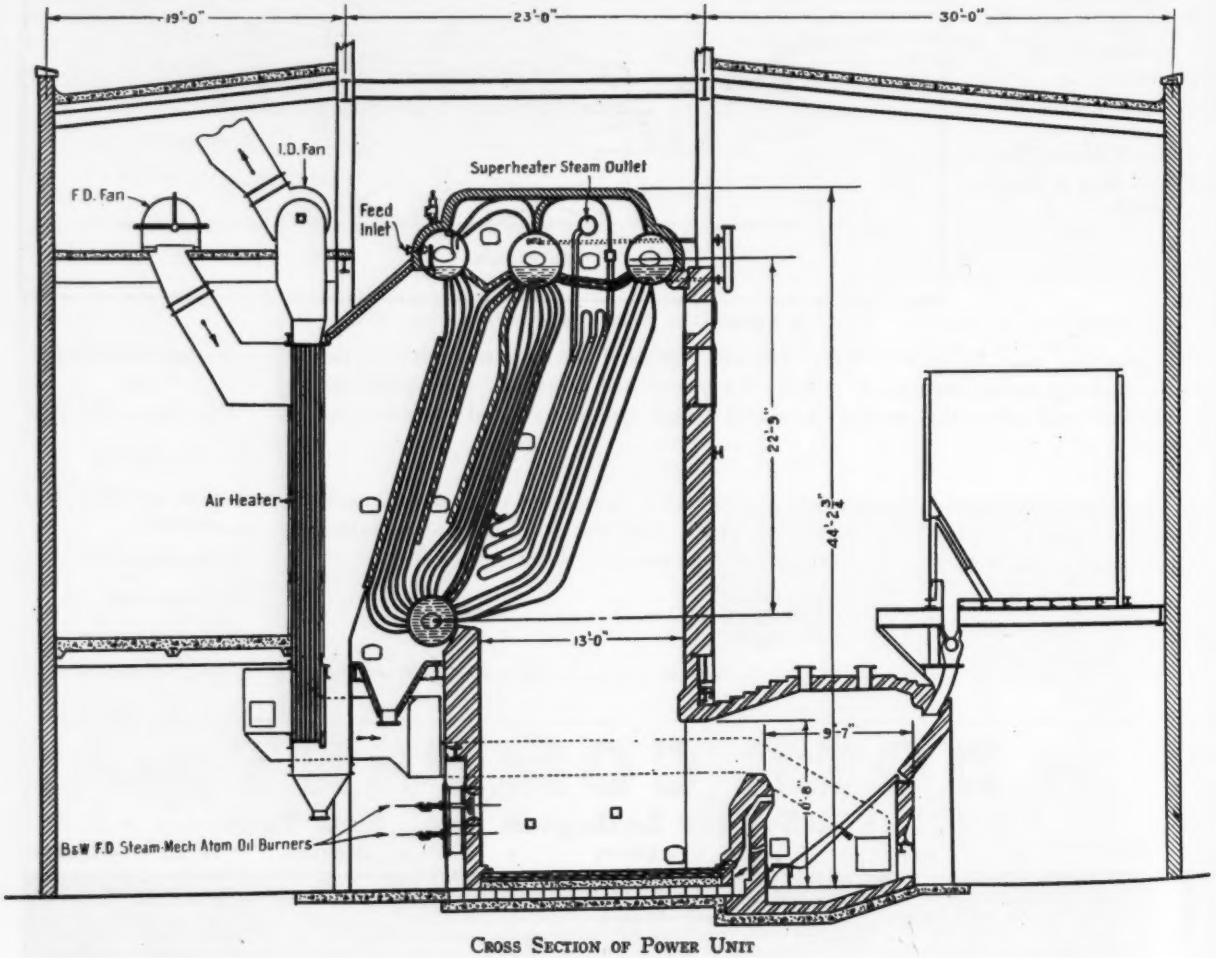
All pumps are direct coupled to motors, the larger of which are of the synchronous type.

The overall efficiency of these units will be exceptionally high, and a minimum amount of floor space will be required. There will be one pump for the flat boxes, two pumps for the suction couch roll, one each for the suction press rolls, and two pumps for the felt conditioners. All pumps of the same size are interchangeable.

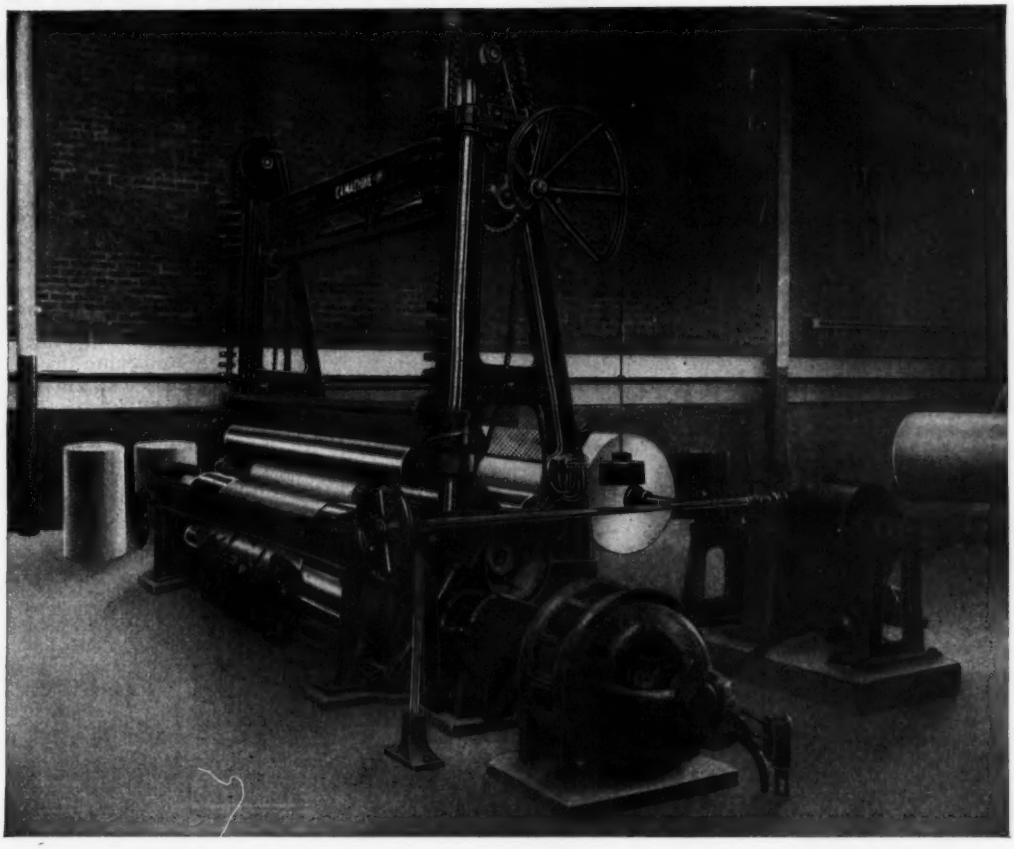
Babcock & Wilcox Power Boilers

This equipment consists of three Stirling boilers. Two of these boilers are equipped with Hofft grates for burning bark and are also equipped with oil burners for auxiliary firing. The third unit is equipped for burning oil alone.

Each of the units consists of a Stirling boiler being set



CROSS SECTION OF POWER UNIT



AT SAVANNAH, GEORGIA

The above illustration shows a 122" CAMACHINE 18 rewinder installed in the Finishing Room at the plant of the Union Bag and Paper Company, Savannah, Georgia, operating on kraft counter rolls.

CAMACHINE 18 is an improved modern rewinder speedy in operation—all rolls are balanced statically and dynamically to run at 2500 F.P.M.

The machine is, of course, equipped with anti-friction bearings throughout.

A patented system of winder drum grooving aids in the separation of rewound rolls.

Both the riding roller and the rewind shaft are equipped with an automatic counterweighting device which controls the density of the rewound rolls uniformly from the core out.

Thrust bearings are built into the rewind shaft to prevent end play of the shaft and provide a perfect ended roll.

The rolls produced with this rewinder will be cheaper to ship and to store because they will contain more actual weight of paper per given diameter of roll.

In addition, the rolls will be clean cut, straight on the ends, and free from slitter cracks or checks on the edges.

CAMERON MACHINE COMPANY

61 POPLAR STREET **BROOKLYN, N. Y.**

over a refractory furnace, there being a superheater and air heater in each unit.

Each of the boilers has a heating surface of 4785 square feet and a maximum capacity with oil firing of 43,750 lb. of steam per hour. The units operate at 430 lb. pressure with 735 deg. Fahr. total temperature of steam.

These boilers have been designed to best meet a demand of 70,000 lb. of steam per hour with an available supply of 7500 lb. of bark per hour. By equipping two of the three units with the Hofft bark burning grates and installing oil burners on each of the three units, the normal steam demand will be met by operating one unit at 20,500 lb. steam capacity on bark alone and the other two units at 24,750 lb. each with oil fuel alone.

Combination firing will be resorted to only when one of the units is not available, in which event the oil fired unit will be operated at 43,750 lb. of steam capacity while another unit will operate at 26,250 lb. of steam per hour with the combination firing of water and oil and using less than 500 lb. of oil per hour.

Babcock & Wilcox Recovery Units

This equipment consists of three B&W-Tomlinson recovery units for the recovery of chemicals and heat from Kraft black liquor. Each unit consists of a B&W boiler with superheater, economizer and air heater, the boiler being set over a Bailey water-cooled recovery furnace.

Each unit is designed for a capacity equivalent to 67½ tons of air-dry pulp per day on the basis of 3000 lb. of solids in the liquor per ton of pulp. With a total plant capacity of 135 tons of pulp per day, therefore, this load can be taken on two recovery units, with the third unit as a spare.

The expected performance of these units contemplates chemical reduction of 95 per cent and steam production of 12,000 lb. of steam at 430 lb. pressure, 750 deg. total temperature per ton of pulp. Chemical recovery is expected to be in the neighborhood of 95 per cent.

The construction of these units is such that should there be additional steam requirements at the plant, the spare unit, which at that time is not operating on black liquor, can be fired with oil.

Cameron Rewinder

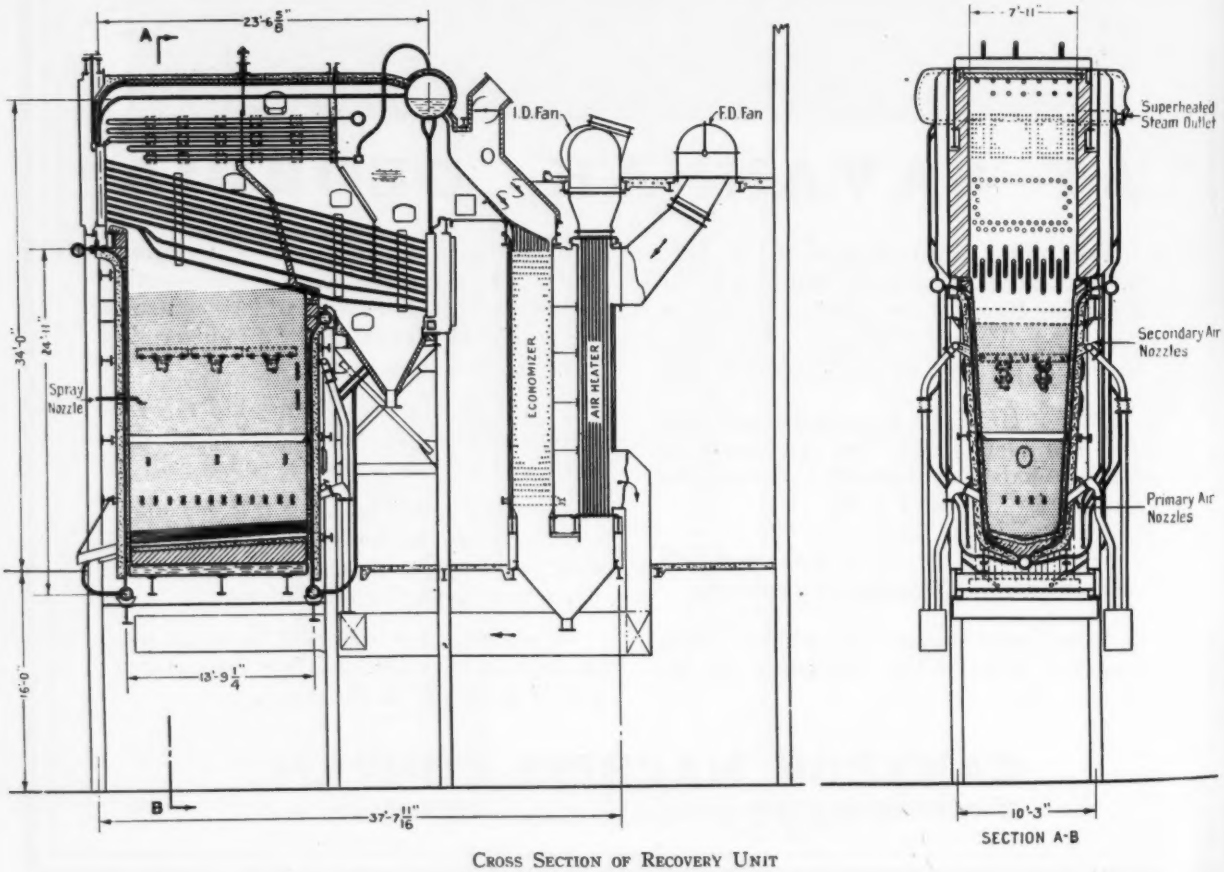
The Union Bag and Paper Company of Savannah, Ga., selected a right hand drive Type 18 Rewinder for their finishing room. It provides for 122 inch trim while the actual drum face is 126 inches.

Rolls can be rewound on this machine up to 60 inches in diameter. Slitter units can be set to cut widths from 5-13/16 inches upward.

The machine is massive in construction and speedy in operation.

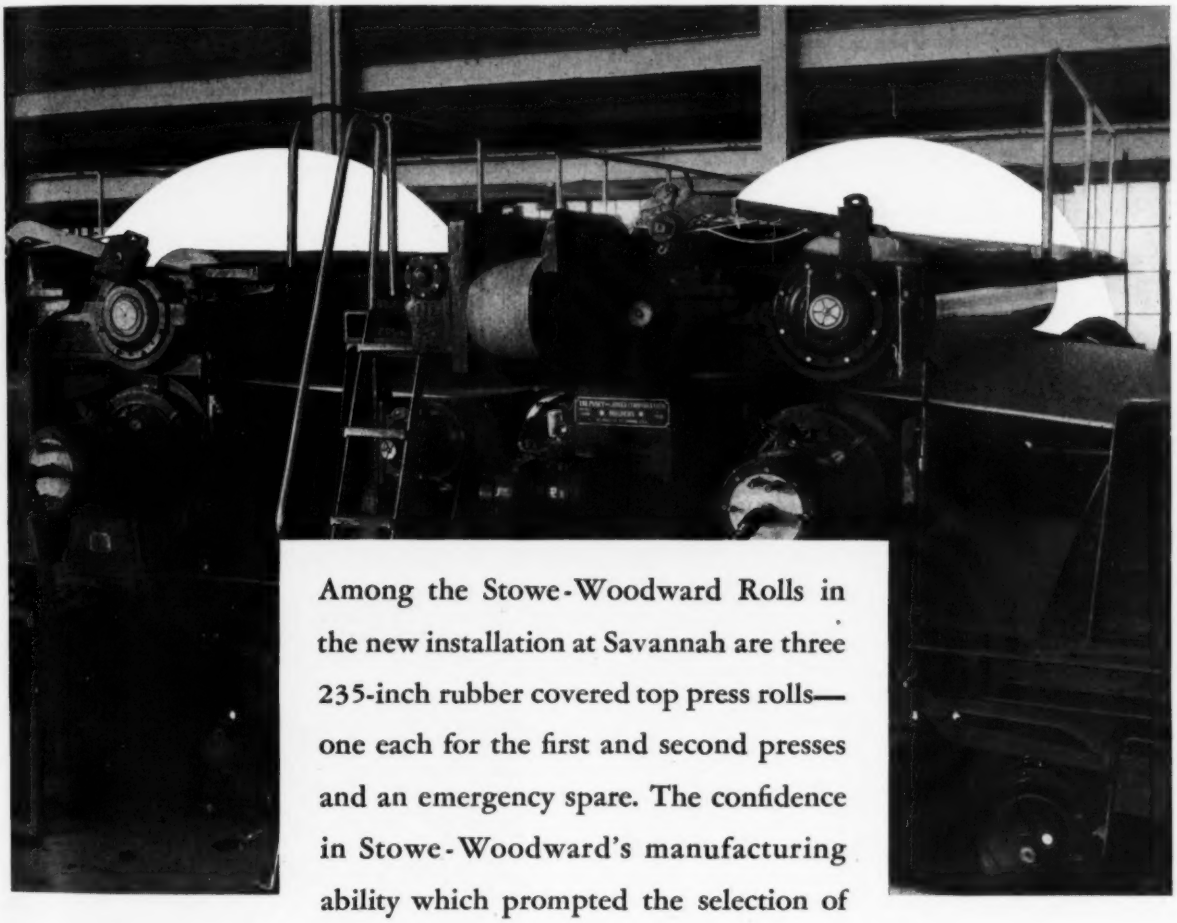
Features incorporated in the machine are a patented system of winder drum grooving for aiding in the separation of rewound rolls, automatic counterweighting device for controlling density of rewound rolls, also means for reversing the sheet winding wire side in or out as may be required.

The spur gears used are all of the Fellows stub tooth form generated on Fellows Gear Shapers. For quiet operation a steel center gear driving these composition gears is



CROSS SECTION OF RECOVERY UNIT

PRESS ROLLS *by* STOWE-WOODWARD *at* UNION BAG & PAPER CORP.



Among the Stowe-Woodward Rolls in the new installation at Savannah are three 235-inch rubber covered top press rolls—one each for the first and second presses and an emergency spare. The confidence in Stowe-Woodward's manufacturing ability which prompted the selection of Stowe-Woodward rolls above all others for these important points will be repaid again and again in satisfaction and trouble-free performance.

STOWE-WOODWARD, INC.

NEWTON UPPER FALLS • MASSACHUSETTS

NEW YORK OFFICE • WOOLWORTH BUILDING

Makers of WHITE STAR *Rubber Covered Rolls,* TANNITE *Couch Rolls* STONITE *Top Press and Smoothing Rolls—All by the* COREWELD *Process*

6930

employed—one gear on each of the two rewind drums and one gear on the platen shaft or cutting roll. The riding roll is driven by means of four bevel gears—two of chrome nickel steel and two of the toughest elevator manganese bronze.

The machine is, of course, equipped with anti-friction bearings throughout.

The rewind drums are mounted on the highest grade SKF heavy duty self-aligning roller bearings and the same bearings are used in the main drive. SKF and Norma Hoffmann thrust bearings are used at all essential points. They are built into the rewind shaft bearings to prevent end play of the shaft and provide a perfect ended roll.

All rolls are balanced both statically and dynamically to run at 2500 feet per minute. The rolls produced with this equipment are clean cut, straight on the ends, free from slitter cracks on the edges and uniformly wound from core to circumference.

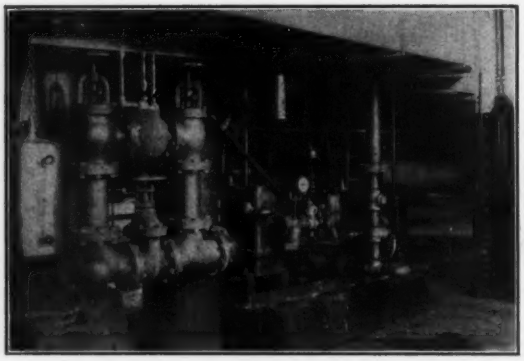
Midwest Fulton System

During the past few years the paper industry has witnessed many important developments, particularly in the use of special equipment to insure a more positive control of each step in the process of paper making. The Fulton condensate and air removal system has kept pace with this progress and is undoubtedly the reason underlying its selection for the Union Bag and Paper Corporation's new ultra modern kraft paper machine.

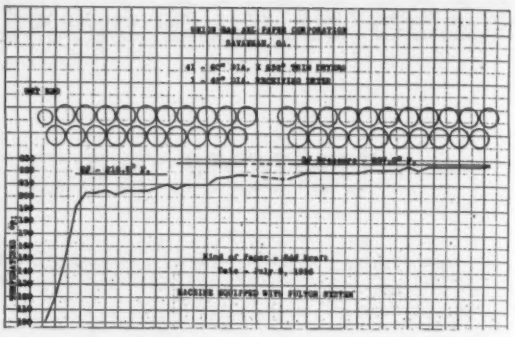
The operating principle of the new type "S" Fulton System used on the Union Bag machine is similar to that of a steam turbine, where the steam is expanded through the various stages to a vacuum, giving up heat in the process. Steam is supplied to the paper machine at the dry end and circulated rapidly through properly divided sections of the driers, until all the useful heat is absorbed in the last wet end drier. In thus creating and maintaining a definite and positive drop in pressure between sections, a constant and unrestricted discharge of all condensate and air from every drier is insured. Before returning the condensate to the boiler plant, all the available flash steam is utilized and applied to assist in producing graduated temperatures on the wet end driers.

In order to insure proper steam distribution within the driers, a special steam distributing nozzle was designed and installed in every drier on the machine. The syphon pipes are internally supported by a special arrangement designed by Pusey and Jones, and Midwest patented condensate scoops are installed on the ends of all syphon pipes. These condensate scoops guide the condensate to the syphon pipes and form a more intimate contact with the drier shell. The Midwest condensate scoop does not stricture the outflow of condensate at this point, but rather aids in its removal.

The condensate pumping unit is of special design, having



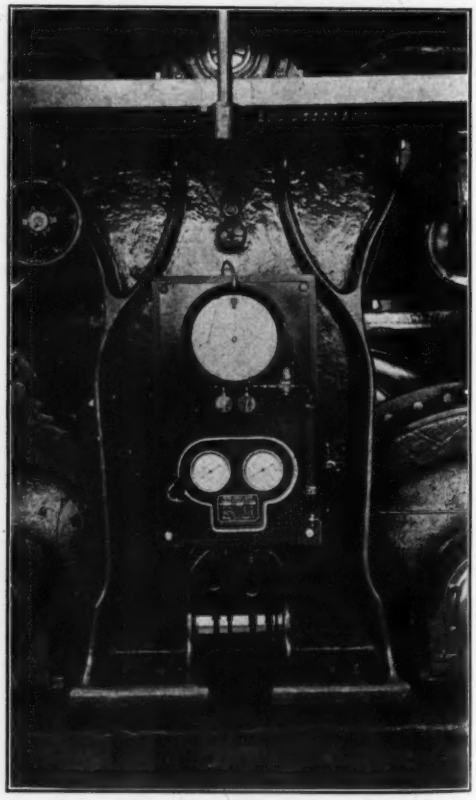
FULTON SYSTEM INSTALLATION ON NEW UNION BAG MACHINE



both a hot condensate pump and an air pump mounted on the same base and direct connected to one motor. Complete evacuation of the air or non-condensible gases is accomplished by a positive pumping action and the air is discharged to the atmosphere at the pump. Thus, the condensate returning to the boiler plant is practically deaerated and it is not contaminated with any cold water injection.

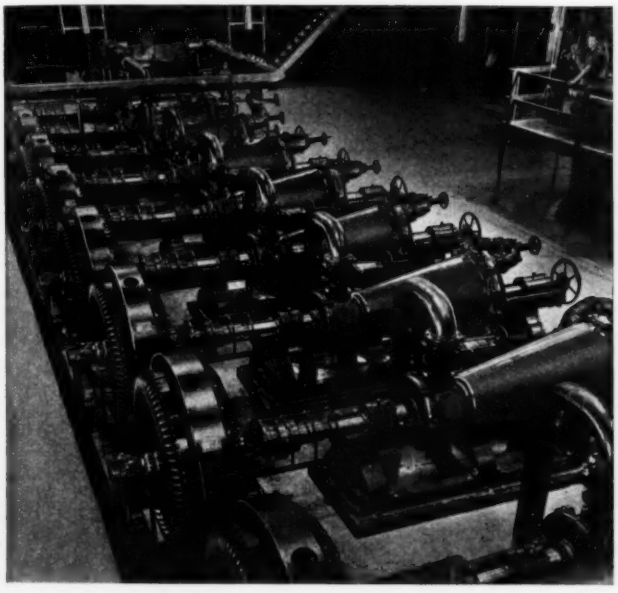
The main steam supply to the paper machine is controlled by means of a Foxboro temperature regulator; thus, the operator has finger tip control over the drying operation at all times. With the Fulton System constantly and completely removing the condensate and air from all dryers at all times, the driers respond immediately to slight or even great changes in steam pressures. The control panel is conveniently located on the front side of the machine near the dry end, as shown in the accompanying photograph.

The accompanying chart No. 2629 indicates the drying curve being obtained on the new Union Bag machine through the use of the Fulton System. This curve was plotted from a check of the drier temperature on July 8,

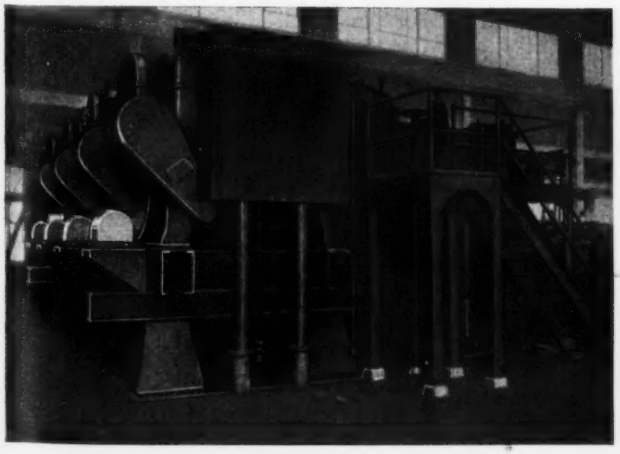


CONTROL PANEL ON FULTON SYSTEM FOR NEW UNION BAG MACHINE

MAJESTIC JORDANS *and* JONES SCREENS *selected for* UNION BAG & PAPER CORPORATION



7 of a battery of 10 E. D. Jones Majestic Jordans each driven by 350 HP Motors—Savannah, Ga.



Battery of 4 Jones Screens on 234" Machine—Savannah, Ga.

We shall be pleased to furnish details and Bulletins regarding Jones products.

The Jones Majestic Jordan is recognized as the standard, in many locations in the South, by which other types of equipment have been compared. The Union Bag & Paper Corporation installation, at Savannah, of ten Jones Majestic Jordans is further proof that—based on any comparison of continuous systems of stock preparation . . . whether power consumption per ton of product . . . maintenance costs . . . efficient operation, or long-term dependability . . . the Majestic is unmatched.

Increased use of Jones Screens, for paper machines, is ample evidence of their high performance records with low operating costs. The four Jones Screens were selected for the Savannah Mill to meet the rigid requirements demanded for Southern Kraft papers—the same perfect screening action . . . ease of operation . . . large capacity . . . low power consumption . . . clean, uniform paper . . . and other important features which have resulted in the broad acceptance and use of these Screens on all grades of paper.

Jones

E. D. JONES & SONS COMPANY
PITTSFIELD MASS.

just shortly after the machine started into production. The temperatures were checked on both the front side and the drive side of the driers and found to be exactly uniform. This is a very noteworthy accomplishment on driers 232" across and is an indication that the Fulton System on this machine is accomplishing the desired results.

Whiting Cranes and Swenson Evaporators

The Whiting Corporation and its subsidiary, the Swenson Evaporator Company furnished the following equipment for the new Savannah mill:
1—5-body Quadruple Effect Long-Tube Vertical Film Type Evaporator for black liquor recovery. For machine room: 1—15-ton LHE electric traveling crane, 86 feet span. For repair shop: 1—8-ton LH Handpower traveling crane, 61 feet 9 inches span. For machine drive: 1—4-ton Single I-beam handpower crane, 9 feet 10 inches span. For roll grinder: 2—15-ton LHE electric traveling cranes, 24 feet 10 inches span. For Stock preparing: 1—5-ton LH handpower traveling crane, 52 feet span. For turbine and pump room: 1—20-ton LH handpower crane, 41 feet span. For paper reel room: 1—6-ton crane, 25 feet span. For unloading: 1—15-ton hoist.

Taylor Automatic Cooking System

The Taylor Automatic Cooking System provides accurate control for the Sulphate Pulp Digester at the new Union Bag and Paper Corporation's plant at Savannah, Ga.

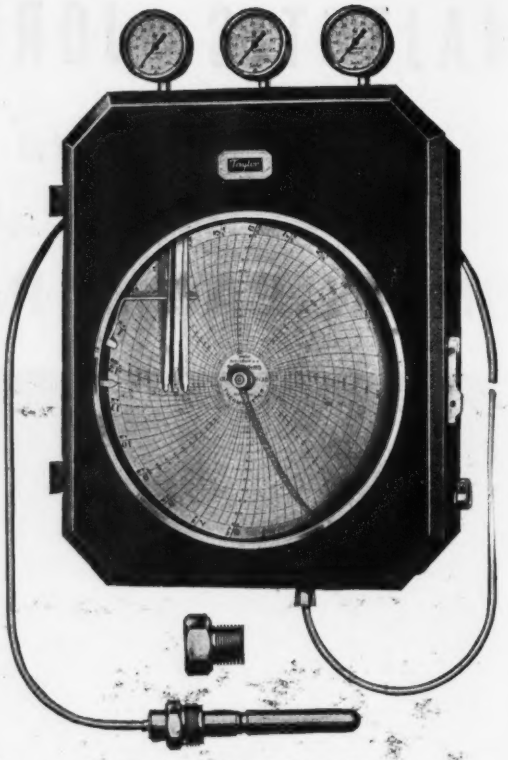
This control takes care of the complete cooking cycle and reduces the manual operation to just pushing a starting button at the beginning and another at the finish of the cook.

The pressure control unit maintains the pressure at a definite point at all times in both the low and the high pressure steam supply to each digester. The pressure to each digester is controlled at a pre-determined point regardless of a pressure change on the down-stream side of the pressure orifice due to the starting or shutting off of a digester.

The temperature recording controller on each digester brings the temperature up with the low pressure steam supply at the beginning of the cook and keeps the relief valve open during this period until the temperature of the stock reaches the boiling point at which time the air having been expelled, the relief valve closes automatically and remains closed during the rest of the cook.

When the temperature reaches the highest point possible with the low pressure steam supply, the high pressure steam supply is automatically turned on and the low pressure cut off.

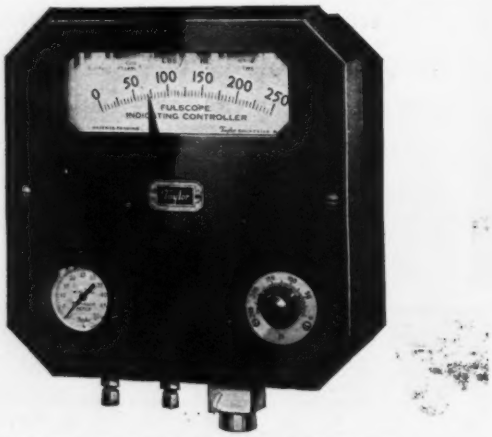
The instruments used consists of two Fulscope Indicating Pressure Controllers, one for the low pressure steam supply line and the other for the high pressure; and for each digester a Dubl-Duty Unit System, Fulscope Recording Temperature Controller with pressure recorder combined, two Evenaction Diaphragm Valves for steam supply, and one for digester pressure release. Auxiliary equipment consisted of air valve, chambers and switches.



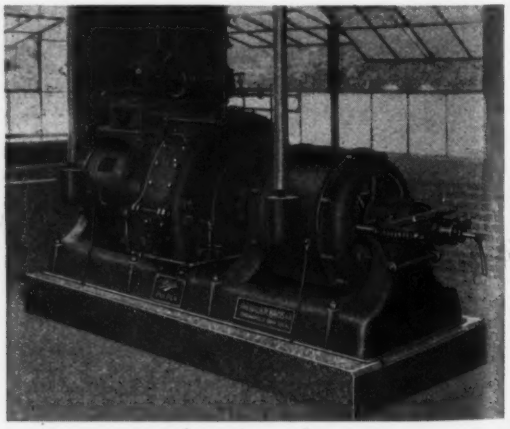
TAYLOR "DUBL-DUTY" UNIT SYSTEM

Bauer Brothers Co.

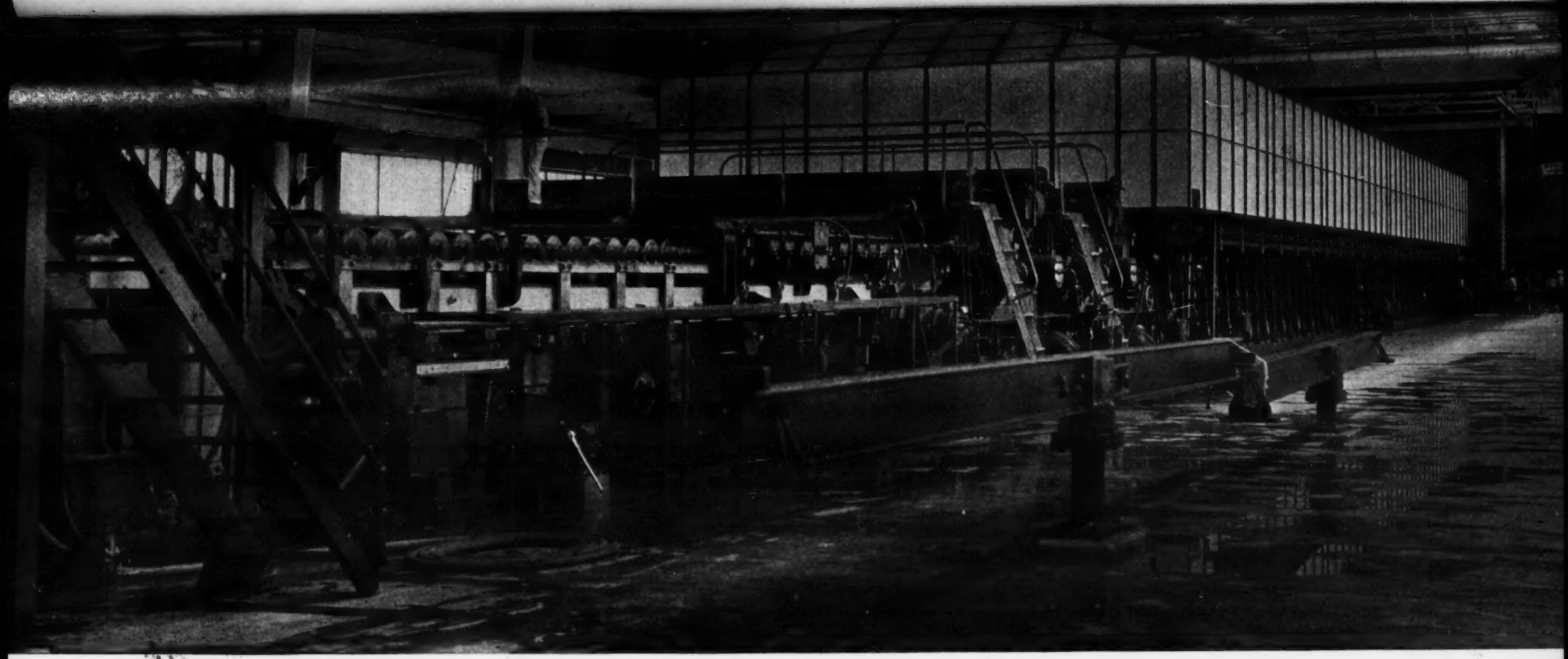
The rejects in the new mill of the Union Bag and Paper Corporation at Savannah, Ga. are handled by a Bauer Double Disc Fibrator, which takes the knots as well as the screenings in a drained state rather than in a slush form. This is possible because the rejects are thoroughly separated from all loose good fiber by the time they leave the screens, so that they enter the machine alone where



FULSCOPE INDICATING PRESSURE CONTROLLERS



BAUER DOUBLE DISC FIBRATOR



For the new plant of the Union Bag & Paper Corporation of Georgia, Puseyjones designed and built the largest modern high-speed machine ever developed for bag paper. This new machine is now in full operation . . . and a second, duplicate unit is now under construction at Puseyjones.

"ask us"

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-making Machinery

[NEWS-PRINT : BOOK PAPER : KRAFT : BOARD]

Wilmington, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

they are reduced to good pulp which can be used in number one stock.

The Fibrator works by rolling squeezing and rubbing rather than by cutting. It is designed internally so the surface of the discs are rather far apart at the center where the rough material enters and the heavy knots and screenings are rolled and squeezed. This action is aided by the inner ribs which are so shaped that they break the chunks open as they fly past each other, much as a nut cracker would do it without the jaws touching. The faces of the discs are closer together as the outer edge is approached and the ribs are varied in size and shape so the knot fragments and smaller screenings are continuously rolled and rubbed as they work outward during the progressive reduction.

In this way the outer section of the disc is supplied with proper sized fibre bundles so that it completes the separation into ultimate fiber by the same rolling and rubbing action without any cutting having been necessary. This is all done with a minimum of mechanical pressure so that there is a minimum of that kind of fiber debris which slows the stock without adding strength. The absence of this fiber debris also helps bulk and the absence of chunky shive helps bulk and strength. The Fibrator is manufactured by the Bauer Brothers Company, Springfield, Ohio.

Trimbey Regulator and Color Meter

The Trimbey Machine Works furnished the new Savannah plant with the consistency regulator for controlling the density of the stock as it goes to their Jordans. Uniformity of density at this point assists in a more uniform hydrating action, and it also gives a uniform consistency of stock in the machine chest so that an accurate "basis weight" can be run on the machine.

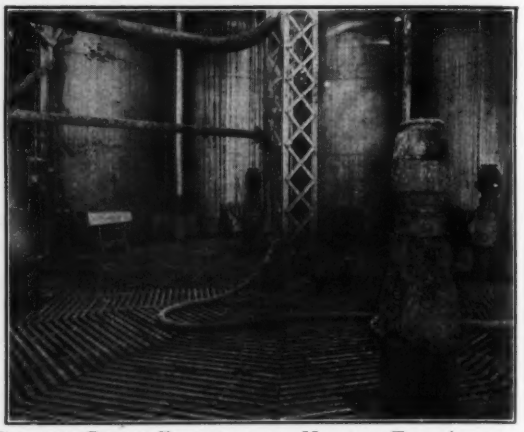
This company also furnished a Motor-Driven Color Meter for the addition of color, as desired, at the machine Stuff Box. Color will be added to the stock directly as it goes to the paper machine and is thus under close and immediate control.

Dilts Broke Beaters

Broke beaters located under each paper machine are of the latest design furnished by the Dilts Machine Works, Inc., Fulton, N. Y. These are of cast iron tub construction with all steel roll of the keyed bandless type and with the recently developed braced bar construction.

The roll is supported in double suspension spring bearings also of cast steel construction and designed to cushion the roll against shocks in both upward and downward direction, and the bearing boxes are of the marine thrust type.

BROKE BEATERS



DIFFUSER CHESTS EQUIPPED WITH VERTICAL TYPE AGITATORS

These breaker beaters are continuous type incorporating both the perforated backfall and the Howell perforated bedplate extractors which are exclusive features with Dilts breakers.

Dilts Diffuser Chest Agitators

Large diffuser chests are equipped with vertical type agitators furnished by the Dilts Machine Works, Inc., Fulton, N. Y., and each chest is equipped with four agitators direct connected to Philadelphia Gear motor reducers making a very compact unit drive.

Automatic Platform Trucks

At the new modern plant of the Union Bag and Paper Company, in Savannah, Ga., three Automatic Low Lift Elevating Platform Trucks and one Telescopic High Lift Fork Truck are operating daily as an efficient system for transporting the large volume of bag rolls-bag bales through the various phases of operation of manufacture to storage and shipping.

The three Low Lift Elevating Platform Trucks, are Automatic Model LN-3 and have a platform 55 inches long, 36 inches wide, 10¾ inches high with a load capacity of 6,000 lbs. These trucks are modern in every respect, designed to cope with the increasing tendency toward heavier payload. Automatic engineers have designed a strong, rugged and compact chassis and have incorporated many new features, such as shockless steer, centralized central system,

AUTOMATIC LOW LIFT ELEVATING PLATFORM TRUCKS

Only Layne CAN OFFER SUCH Experience

THE 6,000,000 gallons of clean, pure water required per day for the operation of the CROSSETT LUMBER COMPANY'S PAPER MILL at Crossett, Ark., will be supplied with eight Layne high efficiency wells and pumps. Such selections are a compliment to engineering foresight.

Layne Wells and Pumps were also chosen to produce the 5,000,000 gallons of water used daily by the UNION BAG & PAPER CORPORATION'S PAPER MILL at Savannah, Ga.

Today Layne stands out as the world's most distinguished leader in the installation of correctly engineered well water systems and in the manufacture of high efficiency pumps. Regardless of what water production problems you may face, Layne engineers can give you valuable advice. No obligation. For illustrated literature write Layne & Bowler, Inc., Dept. F, Memphis, Tenn.

AFFILIATED COMPANIES

LAYNE-ARKANSAS CO., STUTTGART, ARK.—LAYNE-ATLANTIC CO., NORFOLK, VA.—LAYNE-CENTRAL CO., MEMPHIS, TENN.—LAYNE-NORTHERN CO., INC., MISHAWAKA, IND.—LAYNE-LOUISIANA CO., INC., LAKE CHARLES, LA.—LAYNE-NEW YORK CO., INC., NEW YORK CITY—LAYNE-NORTHWEST CO., MILWAUKEE, WIS.—THE LAYNE-OHIO CO., COLUMBUS, OHIO—LAYNE-BOWLER NEW ENGLAND CO., BOSTON, MASS.—LAYNE-TEXAS CO., HOUSTON, TEX.—LAYNE-WESTERN CO., KANSAS CITY, MO., CHICAGO, ILL., AND MINNEAPOLIS, MINN.—INTERNATIONAL WATER SUPPLY, LTD., FORT ERIE, N., ONTARIO, CANADA.

LAYNE PUMPS
LAYNE WELL WATER SYSTEMS

dual inner and outer helical coil spring suspension, center king pin mounting of trailing wheels, V-type Universal joints and safety features into this chassis to provide an efficient dependable material handling unit.

The Automatic Telescopic Tilting Fork Truck is a modern type truck equipped with special forks when telescoped provides a lift of 124 inches for stacking bales and paper rolls. The tilting features permit safe transportation of loads and also provides easy discharge at storage. The truck is used for handling 3500 lb. paper bales and rolls from storage to shipping. The overall length of this truck is unusually short and compact for box car operation. The drive axle is placed at the front of truck and two steering trail wheels are mounted at the rear of chassis. Steering action permits cutting the truck for right angle pick up and discharge.

These fork trucks are the most modern development for flexible, efficient, economical transporting and storing vertically of paper rolls, baled paper or most every conceivable material when loaded on wooden pallets. They are manufactured by the Automatic Transportation Company, 78 West 87th street, Chicago, Ill.

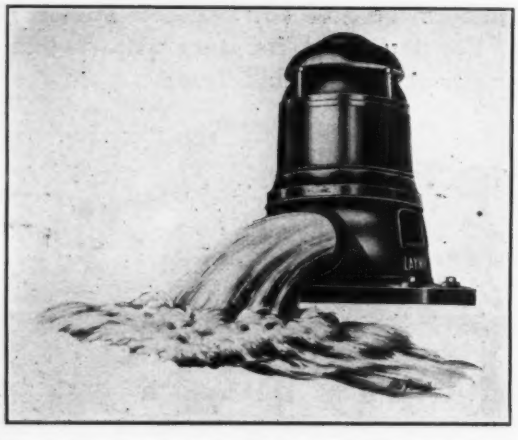
J. O. Ross Engineering Corp.

The heating and ventilating equipment in the new mill of the Union Bag and Paper Corporation of Georgia at Savannah, Ga., was installed by the J. O. Ross Engineering Corporation, and consists of their panel type of fireproof hood arranged with wide overhang and deep curtains to insure catching the vapor. This vapor is removed from the hood itself by means of four full housed fans located on the mezzanine floor above the drives at the rear of the machine. These fans are driven by means of Texrope drives and motors, and the vapor is discharged through stacks to the atmosphere.

The supply equipment is a modification of the systems installed in the northern mills and consists of—apparatus for supplying air by means of distributing duct work to the roof of the paper machine room and to the bottom felt of the paper machine to assist in the drying of this felt and of the paper. The balance of the mill is heated by means of unit heaters.

Layne & Bowler Inc.

When the engineers for the Union Bag and Paper Corporation's Savannah, Ga., pulp mill stipulated a requirement of 5,000,000 gallons of water per day, they selected Layne pumps. Two complete installations were made; one against a pumping head of 258 feet and the other against 280 feet. These wells are of the Layne gravel wall type while the pumps are of the most modern type, thus providing the very highest in efficiency. Each pump is of the Vertical Turbine type with directly connected electric motors which are automatically controlled.



LAYNE PUMP.

The complete installations were made by the Layne-Atlantic Company of Norfolk, Va., a subsidiary of Layne & Bowler, Inc., Memphis, Tenn.

Republic-Smoot Equipment

The Republic-Smoot equipment at the new Union Bag mill consists of Smoot Control for the three power boilers, Republic instruments for the three power boilers, Smoot control for the three recovery boilers, Republic distribution instruments and Smoot desuper-heating equipment.

The Smoot equipment for the control of the three power boilers includes the following:

One—9 tube, 3 section, Master Controller, panel mounted with 3 rating control valves, 9 ratio or selector valves, a manual control element with three throwovers and a steam pressure element for 450 lb. pressure.

Three—Fuel Oil Regulators with special syphon type fuel oil measuring elements and fuel oil metering elements and with 3—3" x 7" relay cylinders.

Three—Air Flow Regulators with air flow differential tops and 5" x 7" relay cylinders.

Three—Furnace Draft Regulators with furnace draft diaphragm tops and 5" x 7" relay cylinders.

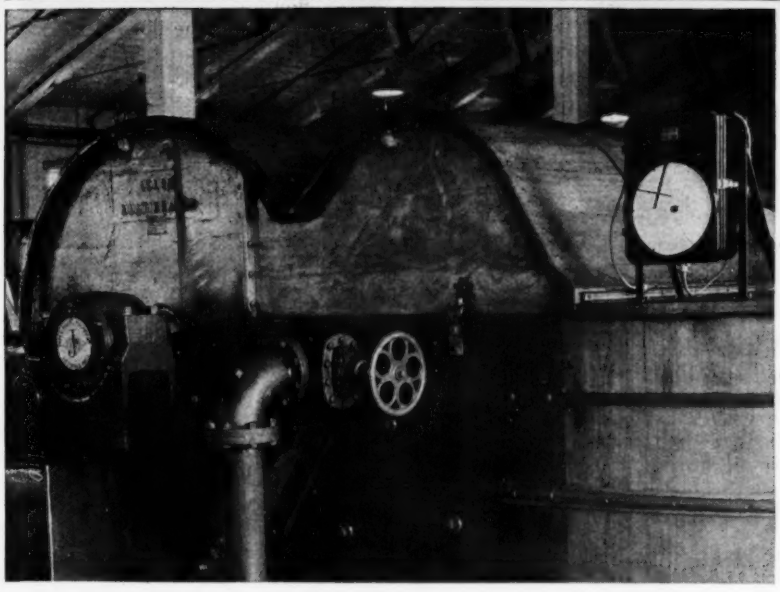
The Smoot Master Controller is arranged to provide complete centralized combustion control for the three boilers so that they may be operated either under automatic steam pressure control to maintain the main steam header pressure constant at all times or so that any of the boilers may be operated at a constant rating or at any ratio of ratings to each other. The fuel-air ratio or CO_2 of each boiler may be set and adjusted at will and the boiler dampers and fuel oil regulating valves operated by the ratio or selector valves from the Master Controller panel.

The manual control element is operated by means of a hand wheel on the panel with which the operator can set the boilers to operate at constant ratings or vary the ratings manually. The three throwovers on the panel enable the operator to instantly transfer any of the three boilers from steam pressure control to manual control, or vice versa. The mercury gauge element, which has three mercury indicating tubes for each boiler—one for each regular—indicates to the operator the air loading pressures or impulses being transmitted to each boiler and to the regulators of each boiler.

The nine ratio or selector valves, three for each boiler, enable the operator to set or vary the rates of fuel-oil flow and air flow of each boiler, separately, and set the fuel-air ratio or CO_2 of each boiler at will and also to adjust the furnace draft. These valves permit the operator to move the boiler dampers and fuel oil regulating valves from the master panel. The three rating control valves, one for each boiler, enable the operator to divide the total plant load among the boilers in any way desired, both on automatic control and manual control. These valves, together with the manual control, may be used in connection with the waste wood firing and with them the boiler, or boilers, firing the waste wood may be set to burn oil at some predetermined constant rating.

The three Fuel Oil Regulators are arranged to maintain the rate of fuel-oil to the burners of each of the boilers, in proportion to the air loading pressures or impulses received from the Master Controller, by operating the fuel-oil regulating valves. The three Air Flow Regulators are arranged to maintain the rate of air flow through each of the boilers, in proportion to the air load-

Temperatures *won't run wild* if Bristol's are on the job!



WHETHER on your Multi-Beater as illustrated at left, or on your other equipment, a Bristol's Recording Thermometer will prove it is worth its weight in gold in the information it places at your disposal. From such information on temperature fluctuations in your plant practice, operations can be improved, uniformity in product obtained, waste curbed, and costs cut.

Write for Catalog 1250J. This is practically a handbook on thermometry you will want to have permanently on file.

THE BRISTOL COMPANY
WATERBURY, CONNECTICUT

Branch Offices: Akron, Birmingham, Boston, Chicago, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco. Canada: The Bristol Company of Canada, Limited, Toronto, Ontario. England: Bristol's Instrument Company, Limited, London, N.W. 10.

JUST A FEW PLACES WHERE BRISTOL'S THERMOMETERS WILL PROTECT QUALITY AND GUARD AGAINST WASTE

Grinder Pit: Temperature of stock.

Acid Accumulator: Temperature of stored acid.

Cooler: Temperature of cooled gas, and of inflowing and outflowing cooling water.

Digesters: Temperature of digester charge during pulping or cooking.

Acid Storage: Temperature of cooking acid.

Acid Towers: Temperature of water used to produce acid.

Reclaiming Towers: Temperature of raw acid, final acid to storage, relief gas to towers.

Evaporators: Temperature of live steam used for evaporators, of inflowing and outflowing concentrated black liquor.

Causticizing Tanks: Temperature of causticizing operation.

Beaters: Temperature of stock during process of beating.

Jordans: Temperature of stock immediately before and after jordaning.

Also temperatures of bleach tanks, deinkers, dryers, glue extractors, paper machine white water returns, rag boilers, sizing tubs, storage rooms.

Bristol's Recording Thermometer, Model 240M. Accurate, sturdy, simple,—ideal for paper and pulp mill service.

BRISTOL'S

TRADE MARK REG. U. S. PAT. OFF.

PIONEERS IN PROCESS CONTROL SINCE 1889

ing pressures or impulses received from the Master Controller, by operating the dampers in the discharge of the induced draft fan of each boiler. The three Furnace Draft Regulators are arranged to maintain any desired draft in the boilers by operating the dampers in the discharge of the forced draft fan of each boiler. This Smoot Control system operates on compressed air taken from the plant compressed air system.

The Republic Instruments for the three power boilers include: Three steel plate panels, 33" x 84",—one for each boiler, on which are mounted: Three Multi-pointer Indicators, each with seven individual, direct reading, horizontal scales. These scales are illuminated from inside the cases and provide indications, for each boiler, of the following: Rate of Boiler Steam Flow, Preheater Inlet Air Pressure, Preheater Outlet Air Pressure, Furnace Draft, Uptake Draft, Preheater Outlet Draft, Percent of CO_2 in Boiler Outlet Gases.

Three 2-pen Recorders, one for each boiler, record steam flow from the boilers and the CO_2 in the boiler outlet gases.

Three 2-pen Recorders, one for each boiler, record preheater outlet gas temperature and preheater outlet air temperature.

Three steam flow integrators, one for each boiler, totalize the flow of steam from the boilers.

The Smoot equipment for the control of the three Recovery Boilers includes:

Three 2-tube Master Controllers, each with 2 ratio or selector valves and 1 Manual Control Element, with hand wheel for setting or varying the rate of air flow in the boiler.

Three Air Flow Regulators with air flow differential tops and 5" x 7" relay cylinders.

Three Furnace Draft Regulators with furnace draft diaphragm tops and with 5" x 7" relay cylinders.

Three Air Flow Regulators with air flow differential tops and 5" x 7" relay cylinders.

Three Furnace Draft Regulators with furnace draft diaphragm tops and with 5" x 7" relay cylinders.

The Republic Distribution Meters are mounted on individual panels which are grouped together with a number of meters which pertain to the boiler plant. These meters include the following:

One 2-pen recorder. One pen records the 425 lb. steam pressure and the other records the temperature of this steam.

One 1-pen steam meter to record 425 lb. steam flow to the turbine and an integrator to totalize this flow.

One 2-pen recorder. 1 pen records the 125 lb. extractor steam flow from the turbine and the second pen records the 125 lb. extraction steam pressure. An integrator totalizes the steam flow.

One water meter to record the flow of condensate from the surface condenser. An integrator totalizes this flow.

One 2-pen recorder. 1 pen records the 30 lb. steam flow to the feedwater heater. The second pen records the temperature of the feedwater leaving the heater. An integrator totalizes the steam flow.

One 2-pen recorder. 1 pen records the flow of feedwater in the No. 1 feed line. The second pen records the pressure in the same line. An integrator totalizes the flow of feedwater.

One 2-pen recorder. 1 pen records the flow of feedwater in the No. 2 feed line. The second pen records the pressure in the same line. An integrator totalizes the flow of feedwater.

One steam meter to record the flow of 125 lb. steam to the digesters. An integrator totalizes this flow.

One steam meter to record the flow of 30 lb. steam to the digesters. An integrator totalizes this flow.

One steam meter to record the flow of 30 lb. steam to the paper machine. An integrator totalizes this flow.

One steam meter to record the flow of 30 lb. steam to the evaporators. An integrator totalizes this flow.

One flow meter to record the flow of black liquor. An integrator totalizes this flow.

One flow meter to record the flow to the bag factory. An integrator totalizes this flow.

One flow meter to record the flow to the caustizers. An integrator totalizes this flow.

One pen recorder. I pen records the flow of well water. The second pen records the pressure of the head of water. An integrator totalizes the flow of well water.

The Smoot Desuperheating equipment includes:

One 3" High Pressure Reducing Valve, operated by
One Steam Pressure Regulator
One 10" x 10" Desuperheater
One 4" Low Pressure Reducing Valve, operated by
One Steam Pressure Regulator.

The 3" Smoot Turbine type, Lever Operated, Reducing Valve is capable of handling a maximum steam flow of 50,000 lbs./hr., and is designed to by-pass steam from the 425 lb. header, reducing it to 125 lbs. pressure.

The Smoot Steam Pressure Regulator, which operates this High Pressure Reducing Valve, is equipped with an 125 lb. steam pressure element. The Regulator may be set for a pressure slightly below the pressure in the 125 lb. header and the Reducing Valve will thus automatically begin by-passing steam when the plant demand on the 125 lb. header exceeds the amount of steam exhausted by the turbine into this header.

The Smoot Straight line, Venturi Type, Desuperheater is capable of handling a maximum steam flow of 50,000 lbs./hr., at 125 lb. pressure and is connected so that both the steam extracted from the turbine at 125 lb. pressure and the steam discharged by the high pressure Reducing Valve will pass through it. (Since the temperature of the steam entering the Desuperheater varies considerably a temperature controller is provided to assure a constant temperature at the Desuperheater exit.

This temperature controller operates a water control valve in the line to the water nozzle ow the Desuperheater.

The 4" Smoot Turbine Type, Lever Operated, Reducing Valve passes a maximum steam flow of 30,000 lbs./hr. from 125 lb. header into the 30 lb. header.

The Smoot Steam Pressure Regulator, which operates this Low Pressure Reducing Valve, is equipped with a 30 lbs. steam pressure element and is arranged to hold the pressure in the 30 lb. header constant by operating the Low Pressure Reducing Valve.

Drag Chain Conveyors for Handling Blocks

The following list of conveyors for the Savannah mill of the Union Bag and Paper Corporation were furnished by Stephens-Adamson Manufacturing Company, Aurora, Ill.:

Two portable yard conveyors, and conveyors Nos. 1 to 5 inclusive, are arranged to handle logs and blocks from storage yard and from barges to barking drums in the wood preparation room. These each have a capacity of approximately 30 cords per hour and are built with a single drag chain to carry logs along a deep trough as shown, at a speed of about 125 feet per minute.

Two Portable Yard Conveyors—Each 74 feet 6 inches long, to collect from cars and storage piles and deliver to yard conveyors No. 1 and No. 3 (operating at right angles).

ENGLISH COATING CLAY

COLOR

OPACITY

ABSORPTION

POLISH

BRILLIANCE

PARTICLE SIZE

100%?

NOT QUITE!
—BUT—
"S.P.S."

BRAND CHINA CLAY IS
OUR LATEST CONTRIBUTION
TO THE PAPER-MAKERS ART

WE THINK WE HAVE ADVANCED ONE STEP FURTHER!—
JUDGING BY TO-DAYS STANDARDS & CONSIDERING ALL THINGS, WE CONGRATULATE OURSELVES. WE BELIEVE WE HAVE AT LAST PRODUCED A CLAY WHICH THE PAPER-MAKER AND HIS PARTNER, THE PRINTER, WILL TERM "100%". BUT TIMES CHANGE.— WHAT OF THE FUTURE? IN FIVE YEARS, WHO KNOWS? THE REASON FOR OUR QUESTION MARK IS OBVIOUS.

WE CHOSE THE NAME S.P.S. BECAUSE IT STANDS FOR SELECTED PARTICLE SIZE AND CONVENIENTLY REPRESENTS THE THREE MAXIMS OF OUR BUSINESS.—THE FACILITIES OF OUR ORGANIZATION ARE AT YOUR SERVICE: WE ARE STRIVING TO PRODUCE SOMETHING TO PERFECTION; WE CONSIDER YOUR SATISFACTION OF THE UTMOST IMPORTANCE.
WE ASK YOU THEREFORE TO MAKE A TRIAL OF THIS CLAY.
THE MATTER RESTS WITH YOU—WE ARE CONFIDENT OF THE RESULTS.

ENGLISH CHINA CLAYS SALES CORPORATION
NEW YORK

Yard Conveyor No. 1—Horizontal conveyor 409 feet long, receives from cars and from one portable conveyor to discharge into transfer conveyor No. 2.

Transfer Conveyor No. 2—Inclined conveyor 100 feet long, receives from yard conveyor No. 1 and delivers to conveyor No. 4 (at right angles).

Yard Conveyor No. 3—Horizontal conveyor 400 feet long and similar to yard conveyor No. 1, receives from cars and from one portable conveyor and delivers (with transfer conveyor No. 2) to conveyor No. 4.

Conveyor No. 4—Inclined conveyor 164 feet long and with 36 foot rise, carrying logs and blocks from conveyors No. 2 and No. 3 up to barking drums.

The following conveyor is similar to conveyor from storage yard, consisting of a single strand of drag chain operating in a continuous trough.

Conveyor No. 5—Horizontal and inclined conveyor 300 feet long with a 36 foot rise, carries logs and blocks from barges on water front, delivering to the same barking drums that are fed by conveyor No. 4.

Drag Chain Conveyors for Handling Barked Blocks and Refuse

Conveyors Nos. 6 to 9 inclusive handle blocks, logs and refuse from barking drums to wood room for chipping and screening.

Refuse Conveyors No. 6 and No. 7—Horizontal conveyors 58 feet long, made of 2 strands of chain with a flight between to carry refuse, bark, etc., from the barking drums to cross conveyor No. 8.

Refuse Conveyor No. 8—Inclined conveyor 104 feet long, similar to conveyors No. 6 and No. 7, with 11 foot rise, carrying refuse from conveyors No. 6 and No. 7 to wood room where it discharges to 24 inch refuse belt conveyor No. 14 (below 30 inch belt conveyor for chips).

Block Conveyor No. 9—Inclined conveyor 84 feet long with 13 foot rise, built with 1 strand of drag chain to carry logs and blocks from barking drum to wood room in a continuous trough, discharges to chipper.

Belt Conveyors and Bucket Elevators

A series of 24 inch and 30 inch S-A belt conveyors carry chips, sawdust and refuse through the wood room, over vibrating screens and up to the digester house, where the chips are distributed to the various digesters and refuse is stored in bins in boiler house. The chips average 25 lbs. per cubic foot and are handled at approximately 30-35 cords per hour. The belt conveyors are equipped with S-A Truss-Frame ball bearing carriers. S-A furnished belt conveyors, bucket elevator, spouts and steel framework for conveyors.

Belt Conveyor No. 10 for Chips—30 inches wide by 21 feet long, carries chips and dust from chippers in wood room up a slight incline to the S-A bucket elevator.

Bucket Elevator No. 11—33 feet high, elevates chips from belt conveyor No. 10 to 2 vibrating screens. Elevator consists of 28 inch by 10 inch by 10 inch steel bucekts bolted to belt.

Two Vibrating Screens—Separate sawdust and refuse from chips.

Belt Conveyor No. 12 for Chips—30 inches wide by 480 feet long, carries chips from wood room up an incline to conveyor No. 13 in digester house.

Flat Belt Conveyor No. 13 for Chips—30 inches wide by 80 feet long, operates horizontally at right angles to conveyor No. 12 to discharge chips into a long steel storage bin located over the digesters. The load is discharged by means of a hand propelled plow which can be moved to any point to scrape the load from the conveyor belt.

Belt Conveyor No. 14 for Refuse—24 inches wide by 394 feet long, carries refuse at approximately 8 cords per hour from refuse drag conveyor No. 8 and vibrating screens up an incline to boiler house. Operates in same gallery and below belt conveyor No. 12. Discharges to belt conveyor No. 15 on floor 42 feet below.

Belt Conveyor No. 15 for Refuse—24 inches wide by 75 feet long, horizontal belt carries refuse and sawdust to flat belt conveyor No. 16.

Flat Belt Conveyor No. 16 for Refuse—24 inches wide by 31 feet 6 inches long, which delivers refuse to 2 storage bins in boiler house. Belt is operated flat, without carriers and a hinged plow can be adjusted to discharge the first refuse bin or to be swung out of position to allow refuse to continue and discharge over head end into second bin.

The problem of removing slivers and sawdust from chips at the new Union Bag mill has been solved by the use of two Type-300 Tyler-Niagara Chip Screens.

These 4 x 12 foot units are equipped with two screening surfaces, the upper surface to size the chips and remove the slivers and the lower surface for the removal of sawdust, grit and other objectionable particles.

The screens receive the output of two large chippers, the

TYLER-NIAGARA CHIP SCREENS.

sized chips being delivered and slivers going to a shredder after which the product is returned to the screen.

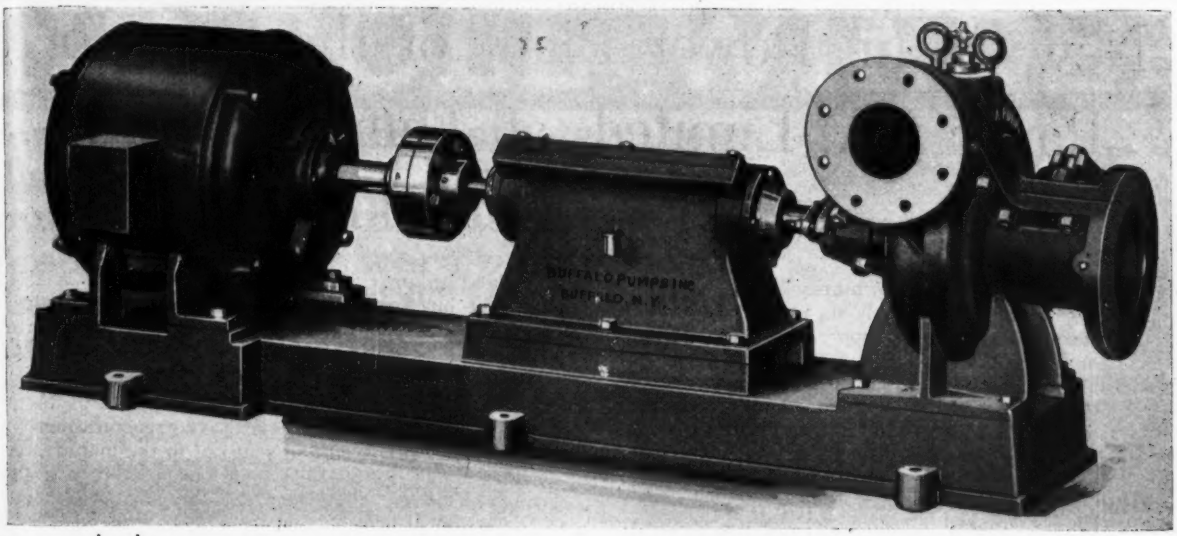
Tyler-Niagara Screens are of the full circle-throw, positive vibration type, equipped with custom built roller bearings on the shaft assembly in both the main and eccentric positions. Labyrinth seals are used on all bearings which make them dust tight.

A screen cloth tensioning device is used on all Tyler-Niagara Screens. This holds the wire cloth under drumhead tension and enables operators to change wire cloth covering quickly.

The perfect balance of Tyler-Niagara Screens, and the close clearances between the bearings and the shaft enable users to operate this type of screening equipment at much higher speeds than other makes of mechanical screens and results in this type of equipment handling larger capacities per square foot of screen area with high screening efficiency.

Maxwell Bardeen Heads Lee Paper Co.

KALAMAZOO, Mich., October 23, 1936—At a special meeting of the Directors, of the Lee Paper Company, Vickesburg, Mich., Maxwell Bardeen, son of the late Norman Bardeen was named general manager of the mill. He succeeds his father who was fatally injured in an automobile accident on October 9.



You need to know—

If you are interested in low costs for pumping paper stock, you'll need to know all about Buffalo Non-Clogging Stock Pumps.

We want you to know that the claims made for these pumps as to performance, reliability and long life, are owners' claims—not ours. Installed in dozens of mills, Buffalo Stock Pumps have set performance records in almost every one.

They do not wedge or clog. They do not wear impeller or side plates. They are so sturdily made that break-downs are almost unknown.

In every respect, Buffalo Ball Bearing, Single Suction Stock Pumps are the finest we know how to build, and if you give one of them a trial—you'll admit that they deserve a place in your mill.

Recently issued Bulletin 953 sent on request.

BUFFALO PUMPS, INC.
443 Broadway, Buffalo, N. Y.

In Canada: Canada Pumps, Ltd., Kitchener, Ont.

"Buffalo" HEAVY DUTY, NON-CLOGGING stock pumps

New Steam Power Plant of the Ontario Paper Co., Limited, at Thorold, Ont.*

By E. J. Calnan

On November 1, 1935, the Ontario Paper Company found that it could depend for only six months on its then only adequate source of steam supply, the three General Electric steam generators which are the property of the Hydro Electric Power Commission of Ontario. The old coal fired plant which had been abandoned four years previously was inefficient, obsolete and in a bad state of repair. While six months of comparatively uncertain winter conditions was admittedly a very short period for the satisfactory engineering and construction of a modern steam plant, it was decided to try to accomplish the feat and have the new plant in operation by May 1, 1936.

With this objective, the management of the company selected a committee from its executive and engineering staff under the chairmanship of R. W. Shaver. This committee was given the almost impossible problem of choosing the type of steam plant most suitable, the most economical pressure to use, selection and purchasing of equipment, demolition of the old building and equipment, and erection of a new plant with a continuous capacity of 300,000 lb. of steam per hour on the same site in a six months winter period; a task which is generally considered to require from nine to twelve months at least.

Study Steam and Power Requirements

The committee first studied the characteristics of the steam and power requirements of the paper mill. The co-operation of several of the major boiler and turbine manufacturers was solicited to assist the engineers in arriving at an early decision on the design, pressure, number and size of units, building dimensions, etc. Several firms assisted in supplying estimates of equipment and installation costs, overall dimensions, expected performance data and estimates of steam and power generation costs for various plant arrangements, ranging in initial pressures from 200 lb. G. to 1,200 lb. G.

These were compiled and studied by the company's committee in conjunction with Stone & Webster Engineering Corporation and H. G. Acres & Co. It was decided that two equal sized units, each capable of generating 150,000 lb. per hour would supply the normal steam demand to best advantage. The most economical pressure was found to be somewhere between 400 and 600 lb., with practically an equal return on the investment for these two points and decreasing returns below and above. Since 450 lb. G. pressure gave equal returns to the next higher step, but required a lower investment, this initial pressure was selected.

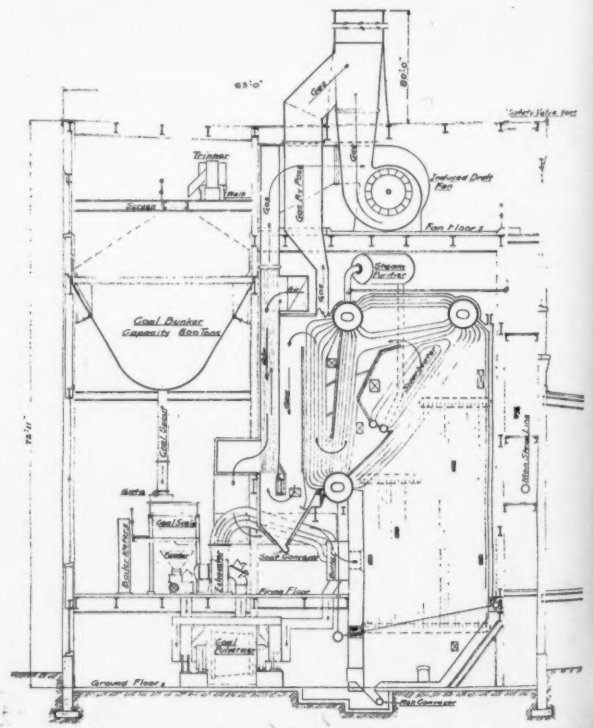
The question of spare steam generating capacity was studied at considerable length. It was pointed out that the Hydro Commission's electric boilers were already installed and could probably be brought into service for short periods if one of the coal fired units should be down for inspection or repairs, and that, by careful selection of auxiliary equipment, the probability of forced shut downs could be greatly minimized. With these considerations, it was decided to provide a building suitable for a third similar unit but for the present to install only the two units required to carry the peak load with a margain of safety.

Specifications for Boilers Prepared

With the major engineering decisions made as to the size and number of units, pressure, etc., specifications for the boilers were prepared and sent out to the manufacturers on November 26, 1935. Quotations were returned by December 10th and the order for the two boilers was given to Foster Wheeler Company on December 13, 1935. To meet the May 1 date it was imperative that the major pieces of equipment—the two 450 lb. boilers—should be designed, constructed, erected and put in service in 20 weeks.

Pending further developments in the power situation and the completion of studies to determine the arrangement best suited for power development, it was decided to generate steam temporarily at 215 lb. G. with approximately 50 degrees of superheat, to be expanded through the existing paper machine drive turbines for drying, and reduced directly to 110 lbs. G. for sulphite pulp cooking. Only 450 sq. ft. of superheater surface was required for this.

Early in the studies of the new steam plant it was found



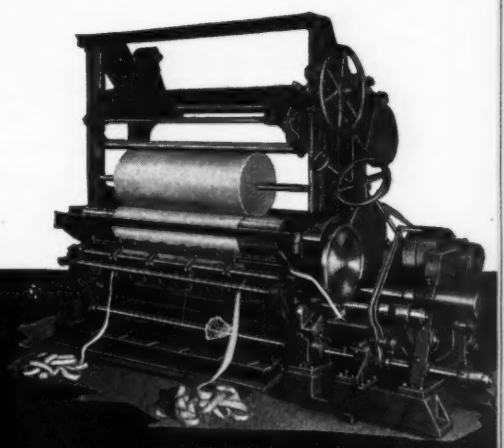
TYPICAL SECTION OF STEAM PLANT. FOSTER WHEELER STEAM GENERATOR, CAPACITY 150,000 LBS. STEAM PER HOUR, PRESSURE 450 LBS. GAUGE 680 DEG. F. T.T.

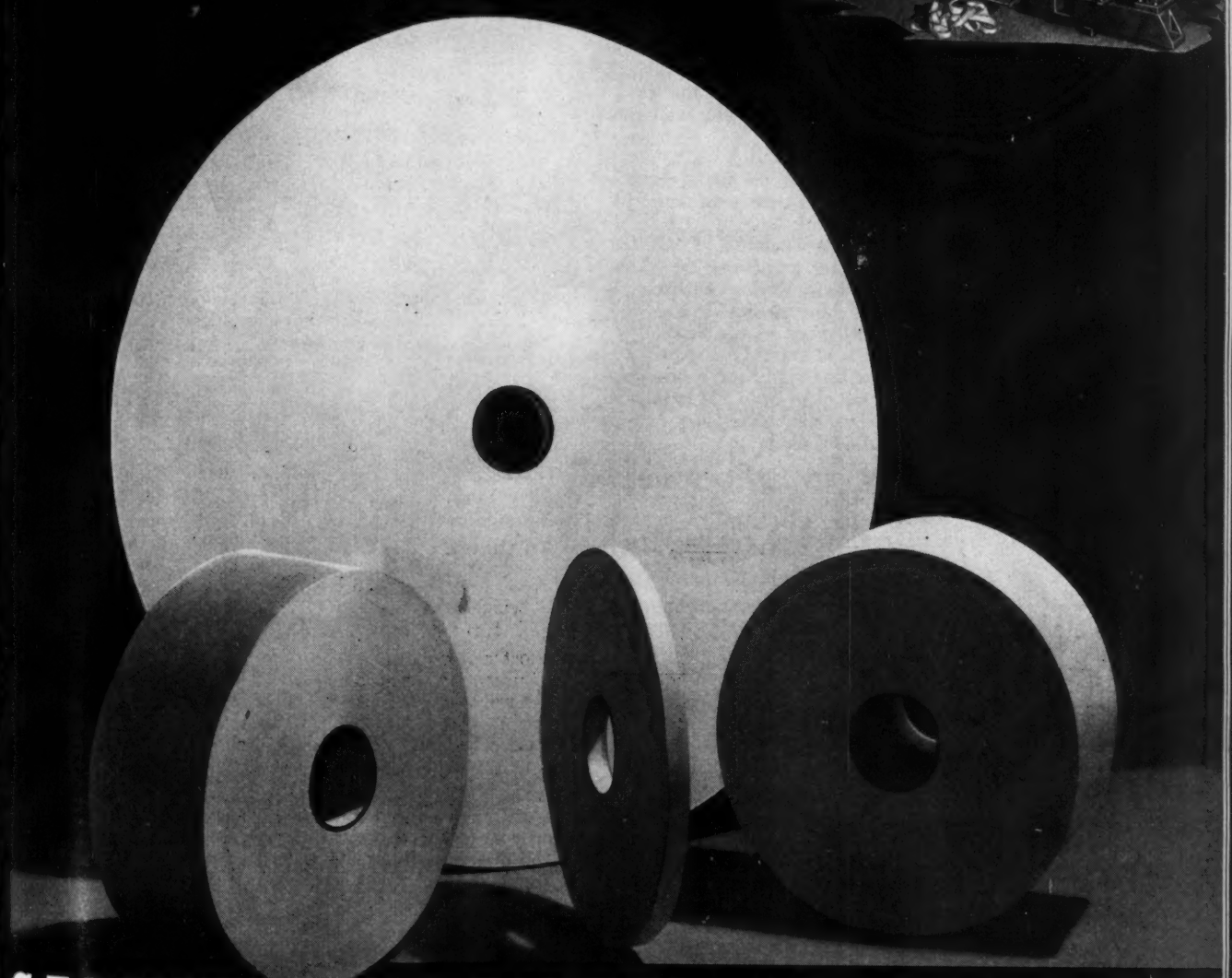
* Part of this material was contained in an article by Mr. Calnan, printed in the *Pulp and Paper Magazine of Canada* earlier this year. The present article is an elaboration of this since it covers the whole steam generation and power development scheme as originally planned.

LANGSTON SLITTERS AND ROLL WINDERS

From core to outside diameter, these rolls of Hammermill Bond have uniform density and clean, square-edged cuts. They were produced on a Langston Type "AA" Slitter. Other types and sizes meet every requirement in the mill, finishing room or paper converting plant.

Type "AA"





SAMUEL M. LANGSTON COMPANY

Camden, New Jersey

that it would be unwise to try to fit new modern boilers into the existing building. With this decision, dismantling of the old boiler plant was started on November 29, 1935, some time before the new units were purchased, and it was practically completed by the end of the year.

During the first week of the new year clearing of the site and excavation was proceeded with and the first concrete for the main building column footings was poured on January 9. Early in January there was about two weeks of favorable weather for outdoor construction work, after which several weeks of near zero weather and deep snow made progress extremely difficult.

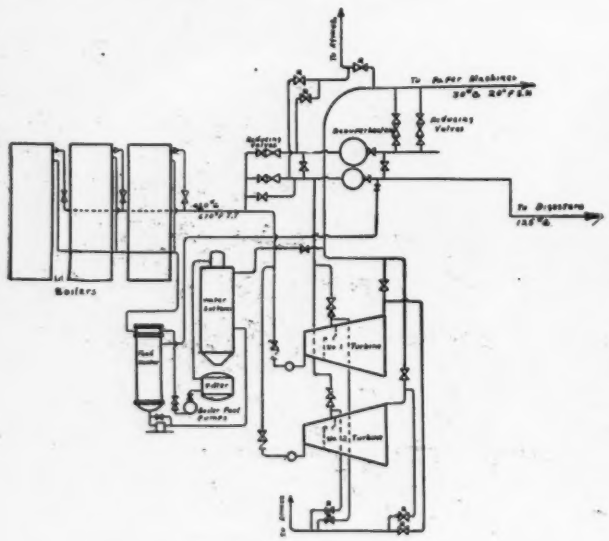
Race Against Time and Elements

The first building steel arrived on the scene on February 6, and from this date it was a race against time and the elements to construct the building and assemble the equipment in the remaining twelve weeks. Vapour from the paper mill ventilation system which is very dense in zero weather made assembling of the steel at the higher elevations extremely difficult and dangerous.

The first brickwork was started on February 26 and boiler erection was started March 4. The first drum was delivered on March 16 and No. 1 boiler was completely delivered by March 19. The second boiler was completely delivered by March 26. The building roof was started on March 11. Boiler brickwork was started March 31. On April 1 the water softener was received. This was the last heavy piece of equipment to be brought into the building and when this was erected the front building wall was started.

The first major mile stone in the completion of the plant was reached when No. 1 boiler passed its final pressure test on April 9. No. 2 boiler followed closely on April 13.

The piping contractors started work on April 10. The first wheel was turned on April 18 when No. 1 induced draft fan was tried out. The boiler brickwork on No. 1 unit was completed on April 23, and a drying-out fire was started on this date, which marked the passing of a second major mile stone. Coal was delivered in the bunker on April 28, and the first burner was started on April 29. No. 1 boiler was brought on the line ready for continuous service on May 6. One week later, on May 13, 1936, the plant was officially opened by His Excellency Lord Tweedsmuir, Governor-General of Canada.



STEAM FLOW DIAGRAM

About two months later, with completion of the studies on power development, and further clarification of the outside power supply situation, it became apparent that it was to the company's advantage to complete the plant, raise the pressure and proceed with the steam power development scheme as early as possible. The turbine generators were purchased, as also the third boiler unit, to give the necessary spare capacity and permit completion of the superheaters in the first two units without interruption to production.

Three Drum Vertical Type Boilers

The boilers selected are of a three drum vertical type with a special tube arrangement using bare tube superheaters, tubular air heaters and no economizers.

The side and back walls of the furnace are water cooled with plain bare tubes, and the bottom of the furnace is water screened. The main boiler and water-wall tubes all have the same cross sectional area, being 3¼ inch diameter with a wall thickness of .167 inch. The superheater tubes are 2 in. in diameter, No. 9 gauge, and the air heater tubes are 2 in. in diameter, No. 14 gauge. The waterwall downcomers are 4 in. diameter, No. 6 gauge.

The drums are all seamless, of fusion welded construction both on the longitudinal and the circular seams.

The dimensions of the boiler drums are as follows:

	Length	Diameter	Shell Thickness	Head Thickness
Steam Drum	21' 0"	44"	1 5/16"	1 1/16"
Separator Drum	21' 0"	42"	1 1/16"	1 1/16"
Bottom Drum	18' 6"	44"	1 5/16"	1 7/8"

For final operation, when the pressure is raised to 420 lb., at the superheater outlet, the total temperature will be 680 deg. F. The heating surface of the units will then be subdivided as follows:

Boiler	12,750
Superheater	2,500
Water walls (projected area)	1,700
Air heater	15,100

For performance guarantees Pennsylvania coal is specified, having the following characteristics:

Heating value as fired, B.T.U. per lb.	13,270
Moisture	2.8%
Ash	8.0%
Sulphur	1.5%
Volatile	34.0%
Grindability factor (Hardrove method)	50

Boiler Settings

The boiler settings were built by Ballard and Sprague of New York. The lower back wall tubes are backed by cast iron blocks, tile and rock wool. The upper back wall and the side walls are backed by formed tile adjacent to the tubes with 4½ in. of standard tile and rock wool insulation. The front wall is faced with 60 per cent alumina brick which is backed with No. 1 fire brick.

Each furnace is fitted with two main 27 in. burners of the Foster-Wheeler intervane type, and one small auxiliary pipe burner for use at low ratings. Each of the main burners is provided with a separate coal preparation system consisting of a Richardson coal scale, aero type coal feeder, Hardinge ball mill of the double classifier type and exhauster with the necessary control features.

Each mill has a rated capacity of 9,450 lb. of coal per hour with a moisture content as high as 10 per cent. When using coal of the characteristics given previously, the expected mill capacity is 5¼ tons per hour, with a fineness as follows:

Through 200 mesh	81 per cent
Through 100 mesh	94 per cent
Through 50 mesh	99 per cent

The pulverizers are driven through reduction gears by 100 hp. double squirrel cage, 750 r.p.m. motors. The ex-

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hausters are driven directly by 40 hp., 1,500 r.p.m. motors, and the feeders use a 1 hp., 1,500 r.p.m. motor. Motors used in connection with the pulverizing equipment were supplied by the English Electric Company.

After considering various fan proposals, with several alternative methods of obtaining draft control—(such as variable speed motors, hydraulic couplings, two speed motors, two motors of different speeds, damper controls and vane controls)—it was decided to use Sturtevant fans with inlet vane controls and a single motor with provision so that a second lower speed motor might be connected to the induced draft fans at a later date if found necessary. The inlet boxes and scrolls of the induced draft fans are fitted with renewable cast iron linings.

The induced draft fans are driven by 150 hp., 750 r.p.m. Commonwealth motors and the forced draft fans have 75 hp., 1,500 r.p.m. Commonwealth motors.

Dimensions of Boiler House

The overall dimensions of the boiler house are approximately as follows: Length, 108 ft.; width, 63 ft.; height from basement level to roof, 73 ft. Concrete floors are provided at the operating level and below the fans, which are located above the boilers.

Intermediate galleries and stairways are of steel construction fabricated from the Standard Steel Company, using Irwin grating. Steel sash was supplied by A. B. Ormsby Company

In addition to a stairway at each end, a 3,000 lb. Turnbull elevator with landings at the various operating levels gives ready access to all parts of the boiler house. The suspended steel bunker, supplied by the Standard Steel Company, is of the catenary type with a capacity of 8¾ tons of coal per lineal foot, or a total capacity of approximately 800 tons. It is lined with a liberal coat of hermastic enamel to control corrosion.

Each boiler has a single self-supporting, steel stack 6¼ ft. in diameter at the top, which is 150 ft. from the ground level. The first two of these stacks were fabricated by John English & Co. That for the third unit was supplied by the Standard Steel Company. The pulverizers are located in the basement, while feeders, exhausters and control equipment are on the operating floor.

Appreciating the importance of providing scale and corrosion-free water for feeding this type of boiler, the services of Hall Laboratories, Inc., were obtained to study the characteristics of the feed water which would be used, and to recommend the most suitable and economical system of water treatment.

Normal Feed Water Available

The normal feed water available consists of approximately 75 per cent condensate returned from the processes slightly contaminated; the remainder being raw make-up drawn from the Welland Ship Canal, high in bicarbonate hardness, with a total hardness of approximately 130 parts per million, expressed as calcium carbonate.

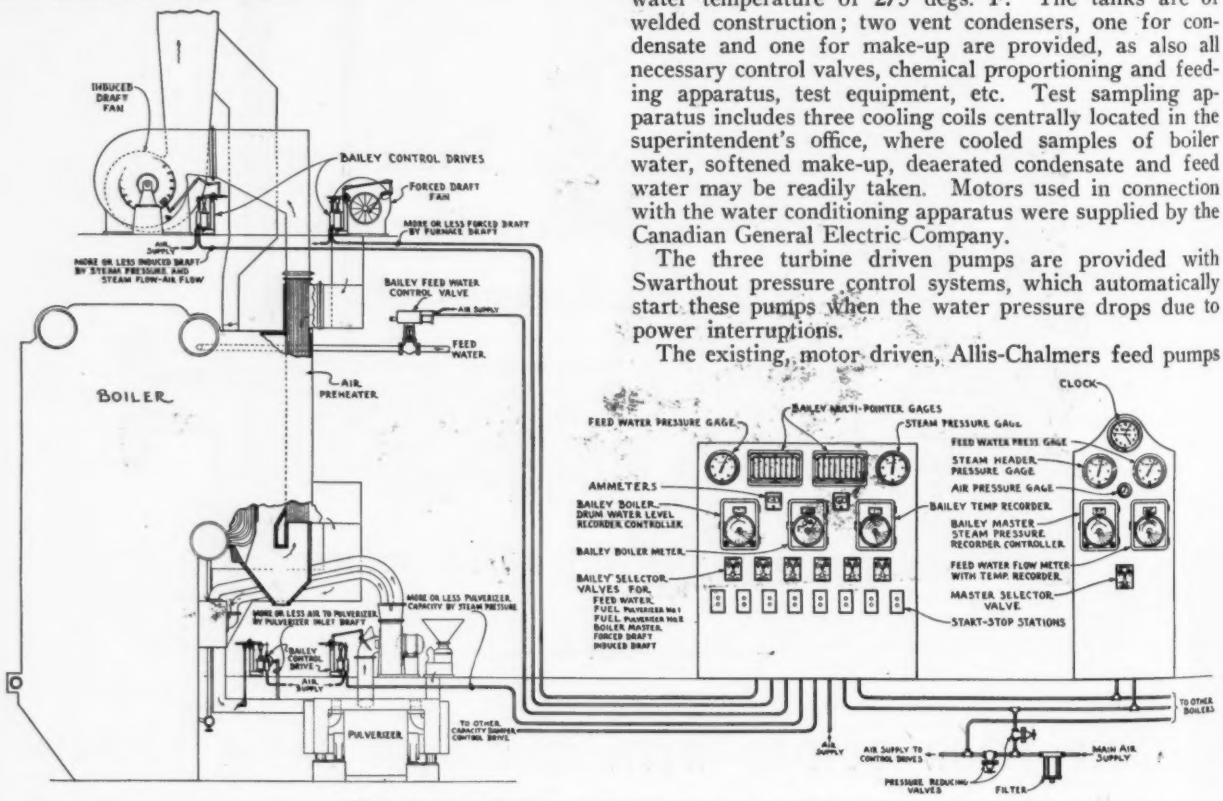
After studying the cost and effectiveness of preparing this quantity of water for boiler use by the various methods, it was found that a lime and soda hot process softener, supplemented with phosphate treatment, would be the most economical and suitable. Quotations on equipment for this purpose were obtained from several firms, and the offer made by Canadian Allis-Chalmers Company on a Cochrane system was accepted.

Cochrane Water Conditioner

The combined Cochrane water conditioner is designed to deaerate and heat 20,000 gallons of condensate per hour and to deaerate, heat, soften and filter 10,000 gallons of raw make-up per hour. The system is designed to operate at pressures as high as 30 lb. G., which corresponds to a water temperature of 275 degs. F. The tanks are of welded construction; two vent condensers, one for condensate and one for make-up are provided, as also all necessary control valves, chemical proportioning and feeding apparatus, test equipment, etc. Test sampling apparatus includes three cooling coils centrally located in the superintendent's office, where cooled samples of boiler water, softened make-up, deaerated condensate and feed water may be readily taken. Motors used in connection with the water conditioning apparatus were supplied by the Canadian General Electric Company.

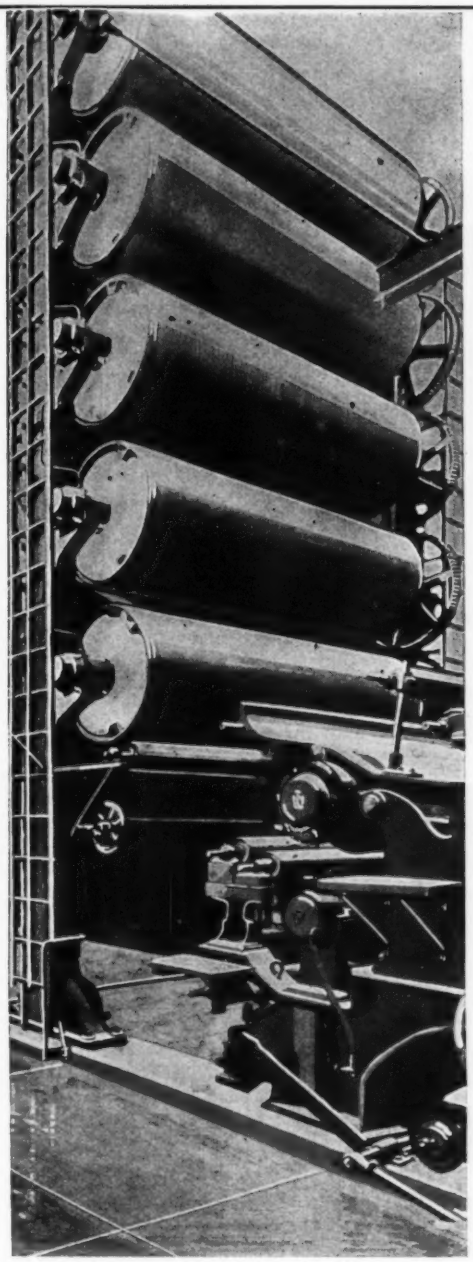
The three turbine driven pumps are provided with Swarthout pressure control systems, which automatically start these pumps when the water pressure drops due to power interruptions.

The existing, motor driven, Allis-Chalmers feed pumps


INDUCED DRAFT FAN
BAILEY CONTROL DRIVES
FORCED DRAFT FAN
MORE OR LESS FORCED DRAFT BY FURNACE DRAFT
AIR SUPPLY
MORE OR LESS INDUCED DRAFT BY STEAM PRESSURE AND STEAM FLOW-AIR FLOW
BAILEY FEED WATER CONTROL VALVE
AIR SUPPLY
FEED WATER
BOILER
AIR PREHEATER
MORE OR LESS AIR TO PULVERIZER BY PULVERIZER INLET DRAFT
MORE OR LESS PULVERIZER CAPACITY BY STEAM PRESSURE
BAILEY CONTROL DRIVE
AIR SUPPLY
PULVERIZER
TO OTHER CAPACITY DAMPER CONTROL DRIVE
CLOCK
FEED WATER PRESSURE GAGE
BAILEY MULTI-POINTER GAGES
STEAM PRESSURE GAGE
FEED WATER PRESS GAGE
STEAM HEADER PRESSURE GAGE
AIR PRESSURE GAGE
AMMETERS
BAILEY BOILER DRUM WATER LEVEL RECORDER CONTROLLER
BAILEY TEMP RECORDER
BAILEY MASTER STEAM PRESSURE RECORDER CONTROLLER
BAILEY BOILER METER
FEED WATER FLOW METER WITH TEMP. RECORDER
BAILEY SELECTOR VALVES FOR FEED WATER, FUEL PULVERIZER No 1, FUEL PULVERIZER No 2, BOILER MASTER, FORCED DRAFT, INDUCED DRAFT
MASTER SELECTOR VALVE
START-STOP STATIONS
TO OTHER BOILERS
AIR SUPPLY
AIR SUPPLY TO CONTROL DRIVES
MAIN AIR SUPPLY
PRESSURE REDUCING VALVES
FILTER

DIAGRAMMATIC LAYOUT OF BAILEY COMBUSTION CONTROL SYSTEM.

Be not the last to lay the old aside!



- **How about a new car without a self starter? Interested? Not much!!!**

- **Why then be last to lay the old double and triple deck dryers aside when the B-C vertical section is, and for ten years has been, standard equipment just as much as the self starter?**

- **Yes, we're talking to mills successfully running lighter papers as well as to makers of board and container. There are today enough mills running lighter papers on verticals to close the doors to debate on that score.**

- **Why verticals? Faster drying, more uniform drying, floor space economy, to list just three points.**

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were used for preliminary operation at 215 lb. pressure and purchase of the 450 lb. main feed pumps was deferred. To provide for feeding during power interruptions, a steam turbine driven pump was purchased with steam nozzles and controls to suit the lower pressure, but built strong enough for operation at the final pressure. This pump, rated at 175,000 lb. of water per hour against 1,325 ft. head, was supplied by Babcock-Wilcox and Goldie-McCulloch Limited. The four auxiliary pumps, two motor driven and two turbine driven for pumping make-up water and condensate also were supplied by this company.

Pneumatic Ash Removal System

For removing ash from the furnace bottoms and the air heater hoppers, a pneumatic system as supplied by the United Conveyor Corporation has been installed. This system uses a steam ejector to induce a rapid flow of air through the special, cast iron conveyor pipes to a cyclone separation chamber, where the cinders and dust are wet down and dropped by gravity into a sump, whence they are removed periodically by the company's locomotive crane into a truck or car for disposal.

Coal is supplied by an extension of the old rubber belt conveyor system over the new bunker with a Link Belt Company travelling tripper. Coal may be supplied directly from a boat unloading at the dock, or from the storage reclaiming system. A storage space for 50,000 tons of coal with a cable-operated bucket system for distributing and reclaiming was provided in 1930 for the old coal fired steam plant, and was still available. Some changes were made to this system to improve its capacity and operation and to adapt it to the higher bunker in the new plant.

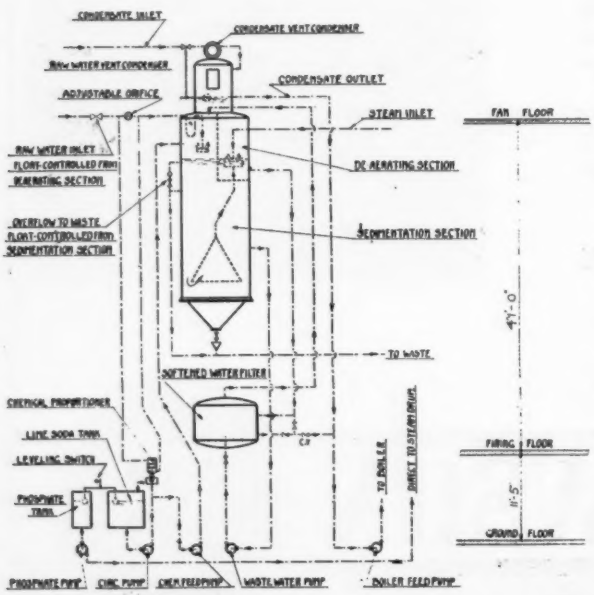
An Outstanding Feature

One of the outstanding features of the new steam plant is the centralized and fully automatic system of combustion, and feed water control, supplied by the Bailey Meter Company, Ltd. Each boiler is equipped with a boiler meter to measure steam output, air used for combustion and steam temperature. Two four pen temperature recorders give a continuous record of the air and gas temperatures to and from the air heaters and two level recorders give a record of the water level in the boilers.

A steam header pressure recorder, feed water meter and water temperature recorder are located on a central panel. The combustion control and feed water regulators are built into these instruments, so that full automatic or remote hand control of the fans, exhausters, coal feeders and the feed water valves may be obtained at the panels on the operating floor. Hand control of the separate pieces of equipment may also be obtained at their location without disconnecting any pipes or linkages. Multi-pointer draft gauges of the Bailey diaphragm type are used to indicate draft relations where required in the air and gas passages. Various pressure gauges on the panel boards were supplied by Peacock Brothers.

The steam drums are fitted with internal baffing and dry pipes. As an added guard against carry over of moisture or solids, a Cochrane steam purifier has been placed between the steam drum and superheater inlet of each boiler. These, together with their dischargers and interconnecting piping and fittings, are designed for the final operating pressure of 450 lb. gauge.

A continuous blow-down system had been used with the electric steam generators, consisting of a flash tank and heat exchanger for heating make-up water. Connections have been provided so that this same system can be used with the new plant.



DIAGRAMMATIC LAYOUT OF COCHRANE DE-AERATING TYPE, LIME AND SODA ASH WATER SOFTENER WITH SUPPLEMENTARY PHOSPHATE-FEEDING EQUIPMENT SUPPLIED BY CANADIAN ALLIS-CHALMERS, LTD.

Fabrication and Erection of Piping

The contract for the design, fabrication and erection of piping for the first two units was awarded to the Pittsburgh Piping and Engineering Company. Where possible, piping and fittings suitable for the final steam and feed water conditions were installed with the first two units. Flanges are used at the fittings and intermediate joints are welded.

The safety valves, blow-down valves and stop and check valves on the feed lines are of the Howden-Turnbull type. The main stop-check valves and the shut off valves on the boiler outlets are of Hopkinson manufacture. The larger low pressure valves were supplied by Crane Ltd., while the small valves are mostly Edwards and Vogt. The water columns, gauge glasses and soot blowers were manufactured by Diamond Specialty Limited.

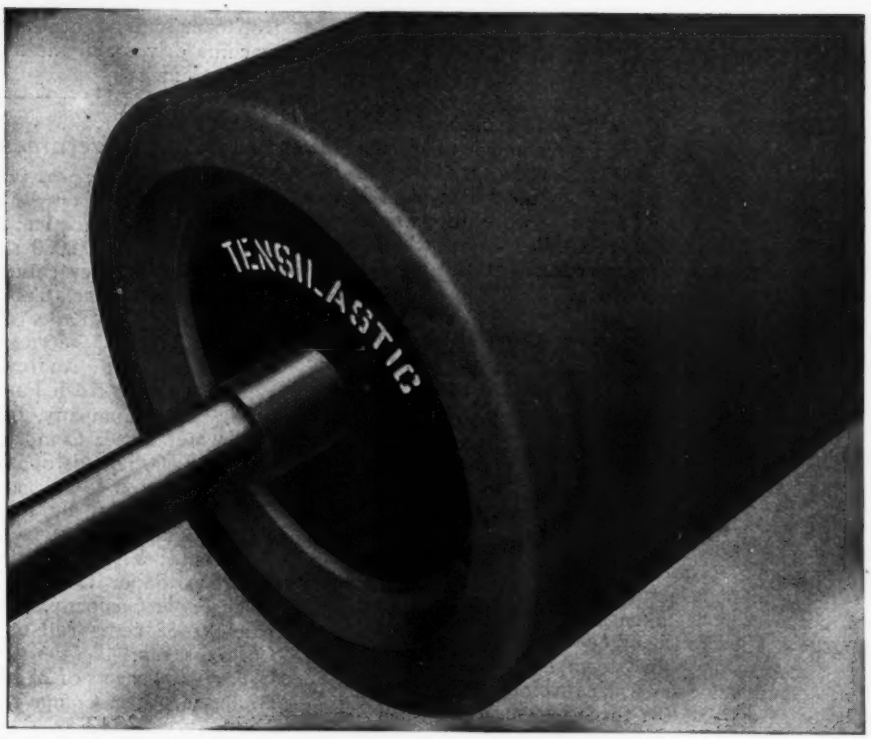
Spun Rock Wools Ltd., supplied the major part of the heat insulation—particularly on the settings, the duct work, the softener and filter tanks and on the steam purifiers. Pipe insulation has been supplied and installed by Robert T. Purvis, Limited. Caposite asbestos covering has been used on the high temperature steam lines—2½ in. thick on the larger sizes (where 680 degs. steam will finally be flowing), and 1½ inches thick on 215 lb. lines. Standard weight 85 per cent magnesia is used on the hot water pipes and anti-sweat covering on the cold water pipes.

The blow-down tank was fabricated by Horton Steel Company. It is 60 inches in diameter designed for 100 lb. operating pressure and is fully vented.

Vacuum Cleaning System Installed

A vacuum cleaning system has been installed. This uses a special steam jet air ejector which operates similarly to the ash removal system and discharges into the same separator. Collecting piping is run to conveniently located outlets throughout the building. Cleaning tools have been supplied by Hoffman Machinery Company Ltd.

The power generating capacity consists of two similar 5,000 K.V.A. geared turbine generator sets, 12,000 volts, 25 cycles. These were purchased from the Canadian General Electric Company. The turbine speed is 5,000 r.p.m.,



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The Tensilgrip Couch is all soft rubber, softer than the ordinary couch—and soft right down to the metal core. Because of its extreme softness, it gives better couching action, more uniform squeeze, better pick-up; follows better any unevenness of the cylinder; withstands more abrasion, requires less frequent grinding; lives longer, and enables you to run the machine 25 to 30 feet faster.

As the illustration shows, the extremely soft Tensilastic rubber is carried over the ends of Tensilgrip Couch rolls as a seal against moisture and corrosion.

Tensilgrip "no-hard-rubber base" Couch rolls are built complete to meet any weight requirements—extreme light weight, standard weight or extra heavy.

When ordering, be sure to state whether you wish internal or external bearings.

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FARNHAM, QUEBEC — 267 Fifth Ave., New York

Pacific Coast Representative: Walter S. Hodges, Pacific Bldg., Portland, Ore.

TENSILASTIC RUBBER ROLLS

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geared down to a generator speed is 750 r.p.m. The turbines are each provided with a single automatic extraction outlet at 125 lb. G. and exhaust at 30 lb. G., non-condensing.

With the major pieces of equipment purchased for the turbine generator plant, there remained to design the building and select the various auxiliaries, both for the turbine plant and for operation of the steam plant at the higher pressure. Two feed pumps were purchased from Babcock-Wilcox and Goldie McCulloch Ltd., each designed to supply the total feed requirements at full boiler pressure. These pumps are rated at 325,000 lb. of water per hour against 1,325 ft. head.

A closed feed water heater to use steam at 125 lb. G. was also purchased from Babcock-Wilcox and Goldie McCulloch.

Reducing and Desuperheating Equipment

Reducing and desuperheating equipment suitable for reducing the full process steam demand in case of turbine outage from 420 lb. to 125 lb., and from 125 lb. to 30 lb. was purchased from the Bailey Meter Company Ltd., complete with temperature and pressure recording and controlling equipment. The desuperheaters are of the Cartridge type manufactured by Elliott, Company. Each pressure reduction is taken by two valves, one of which is almost open before the other commences to open. Flow meters for recording the steam supply to each turbine, the extraction flow from each turbine, and the supply to auxiliaries at each of the three pressures, have also been supplied by the Bailey Meter Company.

Full pressure relieving capacity is provided on the 125 lb. and 30 lb. systems as well as on the turbine casings at these points. Cochrane relief valves are used for the 30 lb. service with Howden Turnbull and Atwood and Merrill for the 125 lb. relief points.

The turbine building is approximately 68 ft. long by 50 ft. wide and 57 ft. high, including the 11 ft. basement. A 40 ton Morris crane has been provided.

Transforming, switching and protective equipment has also been supplied by the Canadian General Electric Company, including four 1,000 K.V.A. transformers, oil immersed, water cooled, 12,000 to 2,200 volts, 25 cycle single phase (three in service); a high tension 12,000 volt switch board which is divided in four panels, and a low tension section which controls power from the secondary of the transformer bank to the five motor generator sets of the paper machine drives and the boiler feed pump motors.

Power and Steam Distribution Systems

New power and steam distribution systems have been provided between the turbine generator room and the paper machines. Power is taken to the synchronous motor generator sets through an underground nine cable system at 2,200 volts.

Steam for drying and heating purposes is distributed at 30 lb. pressure to the control valves at the machines. The major portion of this steam piping system is Taylor spiral welded pipe with Taylor welded fittings. Foxboro 14 inch diaphragm air operated valves control the steam supply at the machine headers.

The two turbine generators will be operated in parellel with the 12,000 volt Niagara system of the Hydro Electric Power Commission of Ontario. Normally the controls will maintain a constant pressure in the 125 lb. and 30 lb. systems. A complete protective relay system is provided to separate the Hydro Electric Commission's system from the mill system in case of various types of faults on either system. When the two systems are separated, the turbines automatically revert to speed and extraction pressure control to maintain a continuous power supply to the paper machine drives and the auxiliaries in the paper mill and steam plant.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., October 28, 1936—The Government Printing Office has received the following bids for 54,000 pounds (200,000 sheets) of 38 x 48 single coated book paper; Bulkley Dunton & Co., 6.66 cents per pound; Reese & Reese, Inc., 6.66 cents; John F. Post, Inc., 6.69 cents; Whitaker Paper Company, 6.69 cents; Stanford Paper Company, 7.66 cents; Virginia Paper Company, 6.66 cents; R. P. Andrews Paper Company, 6.69 cents; Barton, Duer & Koch Paper Company, 6.69 cents; Enterprise Paper Company, 6.37 cents less 1 per cent; and Edgewater Paper Company, 6.66 cents.

For 17,500 pounds of 29 x 41 single coated book paper; Bulkley Dunton & Co., at 6.66 cents; Reese & Reese, Inc., 6.66 cents; John F. Post, Inc., 6.69 cents; Whitaker Paper Company, 6.69 cents; Stanford Paper Company, 7.66 cents; Virginia Paper Company, 6.66 cents; R. P. Andrews Paper Company, 6.69 cents; Barton, Duer & Koch Paper Company, 6.69 cents; Enterprise Paper Company, 6.435 cents (all or none); and Edgewater Paper Co, 6.6 cents.

For 1,700 sheets of 21 x 24 white sensitized paper; R. P. Andrews Paper Company, at $41.50 per M sheets; and Ditto, Inc., $26.12.

For 2,000 sheets of 24 x 36, Quaker drab cloth lined cover paper; Whitaker Paper Company, at 152.90 per M; R. P. Andrews Paper Company, $165.00; Reese & Reese, Inc., $153.50; J. R. Howarth Paper Company, $153.00; Virginia Paper Company, $160.65; and Dobler & Mudge, $156.50.

For 10,000 sheets of 22 x 28 white railroad board; Virginia Paper Company, at $29.10 per M sheets; Reese & Reese, Inc., $30.46; Whitaker Paper Company, $29.10; Dobler & Mudge, $29.10; Old Dominion Paper Company, $29.089; J. R. Howarth Paper Company, $33.00.

For 36,400 pounds (200,000 sheets) of 22½ x 28½ white sulphite index; Virginia Paper Company, at 5.94 cents per pound; George W. Millar & Co., Inc., 5.84 cents; Whitaker Paper Company, 6.06 cents; Stanford Paper Company, 5.94 cents; R. P. Andrews Paper Company, 5.92 cents; Barton, Duer & Koch Paper Company, 5.98; Edgewater Paper Company, 5.79 cents; Aetna Paper Company, 6.06 cents; Old Dominion Paper Company, 6.06 cents; Paper Corporation of the United States, 5.91 cents; Mathers-Lamm Paper Company, 5.83 cents; W. D. Hess Paper Company, 6.08 cents; and Royal Card & Paper Company, 6.06 cents.

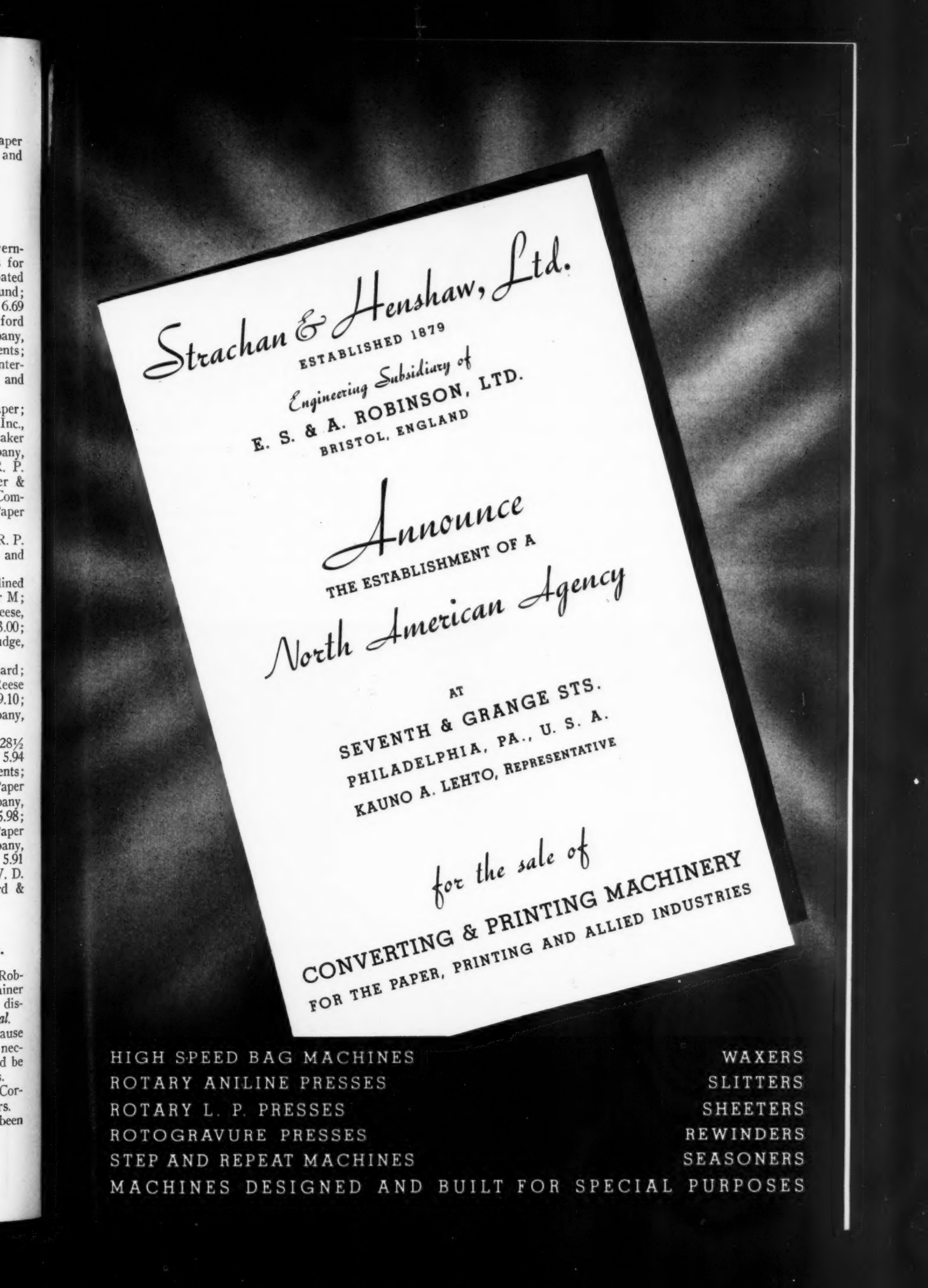
Robert Gair Co. Studied by Atlas Corp.

A study of the properties and financial position of Robert Gair Company, Inc., large unit in the paper container field, is being made by the Atlas Corporation, it was disclosed last week, according to the *Wall Street Journal.*

At the Atlas Corporation it was explained that because the company was studying the situation it did not necessarily mean that negotiations for the purchase would be concluded. The study may extend for several months.

Before acquiring Franklin, Simon & Co. the Atlas Corporation looked into the situation for nearly two years.

A big block of the stock of Robert Gair has long been held by the Old Colony Trust Company of Boston.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SLITTERS
SHEETERS
REWINDERS
SEASONERS
MACHINES DESIGNED AND BUILT FOR SPECIAL PURPOSES

Wausau Paper Mills Co. Changes Production to Fine Papers and Sulphite Specialities

One of the most beautiful views in the State of Wisconsin is from the top of the hill entering the Village of Brokaw, the site of the Wausau Paper Mills Company. The mills are located in a valley on the Wisconsin River, and the view of the river and wooded hills, with the entire village painted white, is a setting that must be seen to be really appreciated.

Under New Management

The mill is a sulphite pulp and paper mill, and is now under new management and new personnel in both the manufacturing and sales departments. W. B. Clements is the executive vice-president and general manager, with offices at the mill. E. H. Larkin is vice president and Sales manager, with offices in the Conway building, Chicago, Ill. W. H. Cunningham is general superintendent, and V. H. Wersel, G. E. Hendrick, David Clark, Joseph Smith, Mark Potter, T. P. Sullivan, and W. J. Garding are the new personnel who have joined the organization under the new management.

In the past, coarse papers were the principal lines manufactured, such as butchers, wrapping manilas and kraft specialties. Beginning the first of May, these grades were discontinued, and the present lines being made are fine papers, such as sulphite bonds, ledgers, mimeograph, and other sulphite specialties.

Numerous Improvements Made

To accomplish this change in manufacture, numerous improvements had to be made; that of major importance being the installation of a water filtration plant capable of producing 7,200,000 gallons per day of crystal clear water. Many improvements to the paper machines and sulphite mill have been made, as well as changes in the power plant. Further improvements will be made to insure the manufacture of quality papers.

The mill has three Fourdrinier paper machines, with space for a fourth, and produces sixty tons per day. The sulphite mill has three digesters, with a capacity of sixty-five tons per day producing bleached and unbleached sulphite.

Timber Lands Controlled by Company

Timber lands are controlled by the company, but are operated by a subsidiary concern, the Yawkey-Alexander Lumber Company, of Schofield, Wis. Harold C. Collins, treasurer of the company, is also manager of the Lumber Company. The Lumber Company is the successor to the Brooks & Ross Lumber Company, who were among the earliest and most successful saw mill operators in the northwest.

A few years ago a new dam was built at Brokaw and is one of the finest on the Wisconsin River.

AIR VIEW OF WAUSAU PAPER MILLS CO., BROKAW, WIS.

EDGAR CLAYS *are different!*

SATIN COATING CLAY

A great achievement in coating material. Highest finish Clay for coating paper without Satin White. Requires less casein for sizing. Purest and cleanest Clay produced. A truly SUPER PRODUCT which is universally accepted by Coating Mills for accomplishing long desired results. Fully covered by patents.

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Recognized everywhere as the highest standard in Coating Clay. Among its superior advantages are: higher finish, because of fineness of individual particles . . . glarimeter shows on equal calendering four to six points advantage over other coating Clays. Requires less adhesives. Greater uniformity of texture. Low moisture content. Better covering qualities, resulting in superior printability. Greater opacity.

For more than fifty years, Edgar has stood for leadership in the development and preparation of Domestic Clays.

Long years' research in pioneering special clays for specific purposes has resulted in *different* clays that are recognized as outstanding achievements . . . and fully approved by American Coating and Paper Mill Superintendents.

For superior results, specify an Edgar Clay to meet your particular requirement. We will gladly mail full particulars, without obligation.

NO-KARB FILLER CLAY

A new high white chemically inert Filler Clay. Noted for its unique attainments in Book Mills. Special properties are: high white color. Super refinement. Best ink receptivity of any Clay. Greater opacity. High gloss finish . . . non-blackening. 80% to 90% retention. Non-abrasive. Can be sized with rosin and alum.

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Greater retention — many instances have shown 10% to 20% increase. Better opacity. Runs practically gritless. Uniform low moisture content. Higher finish. Corrects fuzzing to a remarkable degree.

D. R. G. FILLER CLAY

To be used whenever air-conditioned Clays are required.

AMERICAN MADE FOR AMERICAN TRADE

The above special clays complement our complete line of clays for every requirement.
Avail yourself of our technical service both for coating and loading, without charge. May we have our Service man demonstrate and prove these points to you before you contract on clay for next year?

EDGAR BROTHERS COMPANY

50 CHURCH STREET - - NEW YORK CITY

Flat Box Vacuum Control on Fourdrinier With or Without Barometric Legs

By A. E. Broughton

It is my desire to explain a new system of handling the vacuum on flat boxes under the wire of any Fourdrinier paper machine. This new scheme has proved its usefulness in a great many installations now operating successfully. It permits the machine tenders to do things on the wire which were never before thought possible.

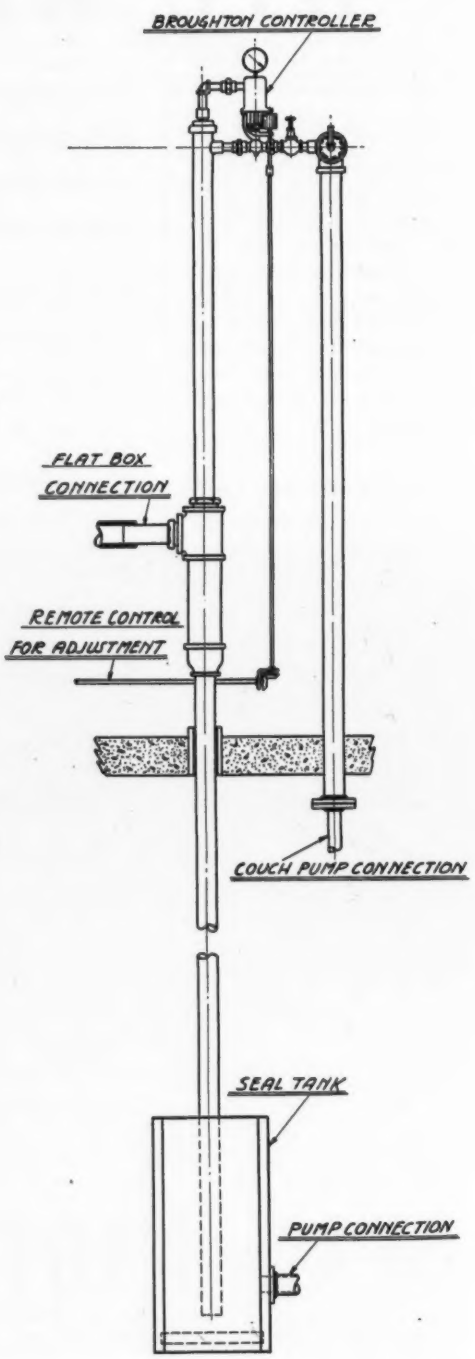
Design of the Flat Box

As a general rule, about one-fourth of the water traveling under the slice is carried away through the flat boxes. The major portion of this is handled by the first one or two wet boxes. The type of cover must be of such a design to allow the water to flow freely. A cover with holes naturally requires a higher velocity than one with slots, and this velocity must be obtained by more pull or higher vacuum and more power consumed than necessary and wire life decreased. The design, of the flat box itself, must be such that the water passed through the cover be allowed to flow easily to and through the outlet connection and, if the cross section area is such that velocity and pull are again necessary, more power is wasted. The flat box should be such that the least amount of vacuum is required to pull the water through the wire, and once it is in the box, gravity controls it from there.

Vacuum pumps are air evacuators, not water pumps, and yet it has been quite customary to carry both the water and air through the flat box vacuum pump. This is exceedingly wasteful in power and usually detrimental to the quality of the sheet on the wire. The pump intermittently becomes monopolized by water, decreasing its vacuum pull which, in turn, decreases the water flow to it. This allows the pump to catch up, and pull air for a moment, and the vacuum rises. The gauge on the flat box header is constantly fluctuating, showing that the water is leaving the box in slugs. Furthermore, this intermittency in the velocity of water removal has a tendency to cause chatter or grab, and, if the stock on the wire is subject to occasional radical variations, even wire stops. The usual method of controlling the vacuum in the box, in installations of this kind, is a hand valve in the discharge pipe, throttling both air and water and the box usually runs partly or totally full. Sometimes, a little slower stock on the wire brings down a little more water to the first wet boxes, which cannot be taken away because of their being throttled, and little so-called fingers of water extend under the dandy, having a tendency to cause crushing and streaks.

Individual Gauges at Outlet of Each Box

The vacuum breaker admits air into the pump in amounts to equal its capacity at the level or degree of vacuum required on the boxes. This requires the pump to handle a great deal more air than actually travels through the boxes. These breakers are usually weighted or spring loaded relief valves and subject to inertia. The intermittency in the pump vacuum explained above sometimes causes these breakers to chatter, and really increases the amount of intermittency in the pump. All this is portrayed in the fluctuations of the vacuum gauge on the box header. A vacuum gauge on the flat box suction header does not portray a true condition of vacuum on each box. Due to the throttling action of the pipe connection of the

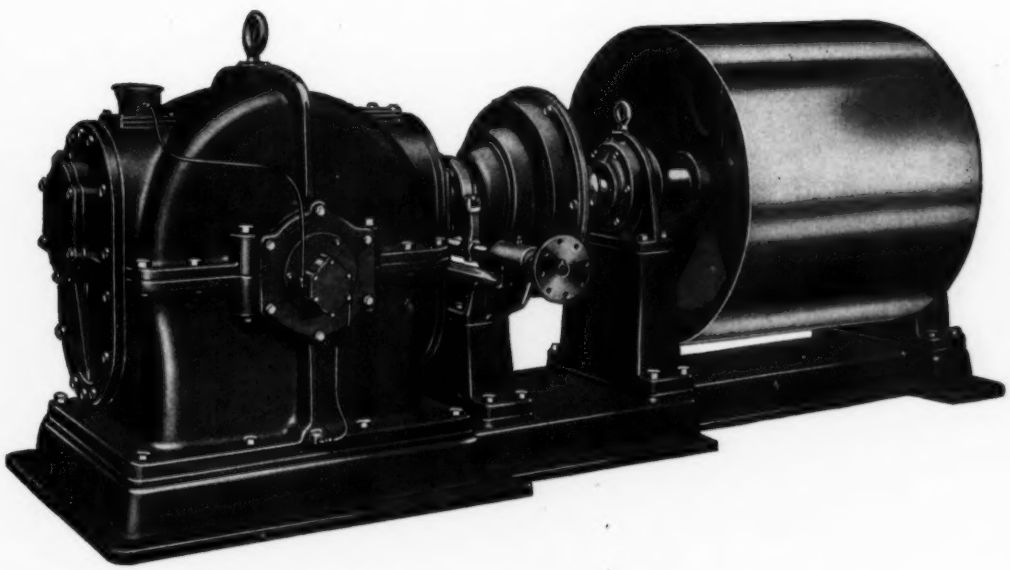


DIAGRAMMATIC SCHEME OF BROUGHTON SYSTEM

Paper Making Machinery
THE BAGLEY & SEWALL CO.
Watertown N.Y. U.S.A.

HYPOID GEAR DRIVES

Equipped with Cut-Off Type Double Disc Clutches



For silent, smooth delivery of power to the paper machine--
reduction of maintenance costs and increase of production

THE BAGLEY AND SEWALL COMPANY

WATERTOWN, NEW YORK

REPRESENTATIVES: R. T. PETRIE, 3125 N. E. 42nd Ave., Portland, Ore.—E. W. COLE, 1028 Clinton St., Kalamazoo, Mich.
H. M. SUTTON, 10 Forrest Ave., Haverhill, Mass.—C. E. THOMPSON, 295 E. Dunedin Road, Columbus, O.

boxes to the header and to the fact that this gauge is measuring both the velocity of air and water through the header, it reads considerably higher than the actual vacuum on the boxes. On one installation that we recently made, we had occasion to test the vacuum gauge on the suction header which showed 10 inches, but when we imposed the same gauge directly on the box outlet, we found but 3 inches of vacuum actually on that box. The installation of the flat box vacuum gauge on the suction header we believe to be misleading to the operators. It is far better that individual gauges be installed immediately at the outlet of each box.

There are some installations of the water and air being drawn into a separating chamber; the water falling by gravity into a seal tank and the air alone being carried into the pump. The degree of pull is governed by breakers as just explained. The pump in this case requires somewhat less power than it does when the water also passes through it. The boxes must necessarily have the same vacuum. To attempt to break one box more than another, of course relieves them all, and is the reason why throttling of the box discharge must be resorted to in order to obtain any gradation of vacuums.

An Assumed Condition

Assume a condition, to begin with, where thirty horsepower was required on the flat box vacuum pump, and by making the change of separating the air and water, but twenty horsepower is used. Still enormous excess quantities of air are passing through the breakers. A second change is made, whereby each box is controlled by a special controller in the air release line only. The water is allowed to drop freely into the seal tank below, but the pull of the pump on the box is automatically governed by this controller to any degree that the operators set it. Each controller has its own breaker, a function of the valve stem itself, and allowing air directly into the box only. This breaker cannot function until the controller is closed. For instance, the operator sets the control on the first wet box at two inches on the gauge. Just enough pull from the pump is allowed through the control to maintain that two inches of vacuum. The stock on the wire becomes slower or heavier, increasing the seal and having a tendency to increase the vacuum to two and one-tenth inches. The controller automatically closes and the breaker opens up just a trifle to permit just enough air to bleed into the box to keep that vacuum down to two inches where the operators set it. The pump is required to handle only that air that actually comes through the box, and the twenty horsepower that had been used can be cut down to five or even less.

Critical Limit or Holding Power of Paper

Every sheet of paper has a critical limit or holding power. For instance, this sheet, at which you are now looking, in passing over the couch of a paper machine approximately 150 inches wide may permit 1,500 cubic feet of air per minute to pass through it at a vacuum of 15 inches. To obtain a vacuum of 15½ inches on the couch of this machine, providing 15 inches of vacuum is the critical limit or holding power of this sheet, almost double the amount of air is passing through the sheet and yet the vacuum has only risen about ½ inch. It has been our observation that the vacuum pumps supplied for the couch on paper machines have been large enough to reach the critical limits of the papers being made and pull slightly beyond it. Where this condition exists, it is possible to connect the suction header of the flat boxes into the couch vacuum pump and rob the couch pump of a small portion of the excess air passing through the sheet beyond the critical limit of that sheet and without visibly affecting the couch vacuum pump holding power or its power to drive. In other words, by the use of this new control system on the flat boxes, the flat box vacuum pump can usually be totally eliminated. There are now about 170 installations of this nature on Fourdrinier paper machines within the United States and Canada and on 160 of these installations, the flat box vacuum pumps have been completely eliminated without affecting the couch vacuums. On the other 10 installations, on machines making more open types of paper it has been necessary to install vacuum pumps.

No Longer Any Fundamental Fault

There is no longer any fundamental fault in this power saving scheme of separating the water and air. The box vacuums can be gradated to any degree the operators require without affecting in the slightest the vacuum pull of the supply pump. All surging or intermittency is totally and completely eliminated. A bad box will show up literally 'like a sore thumb' and will not affect the vacuum of the boxes on either side of it. There will be no more wire stope due to grabbing, thereby increasing wire life. Any vacuum setting is held absolutely steady regardless of stock changes on the wire. The ability to gradate the vacuum and depend upon its holding exactly where he sets it, allows the machine tender to set up conditions tending to better formation, decrease two-sidedness, and work more water into the sheet.

Recent developments permit the installation of this new system on those paper machines under which there is no basement or where it is not feasible to install barometric legs.

New Republic Steel Booklets

A new series of booklets on Enduro Stainless Steel have just been released by the Republic Steel Corporation, of Cleveland, Ohio. The booklets, five in number, are characterized by layout and typographical treatment radically different from Republic's previous publications on this product. Cover illustrations are reproductions of photographs of various mill operations in the production of Enduro. All of the booklets are profusely illustrated.

First in the series is a booklet of general nature, explaining the reasons for the amazing rise in popularity of stainless steel and illustrating many of the more important applications of Enduro. A highly useful feature of the booklet is a chart listing the analyses and detailed properties of thirteen of the principal types of Enduro, contrasted with the properties of a common carbon steel, S.A.E. 1020. Another useful table sets forth the degree of corrosion-resistance of four leading types of Enduro in the presence of some 300 foods, chemical products and reagents. This data is the fruit of a tremendous amount of research on the part of Republic's metallurgists.

A second book features detailed data on Enduro 18-8 and its several variations. The third booklet is devoted to the straight-chromium types of Enduro—AA, S, S-1 and FC. The fourth booklet contains information on the heat-resisting types of Enduro—HCN, HC and NC-3. The fifth booklet treats Enduro 4-6 per cent Chromium Steels. These latter steels are not stainless but are intermediate between ordinary carbon and stainless stels.

The Republic Steel Corporation will be glad to honor all requests for copies of the booklet received on business letterheads.

Agents for Howard Paper Co.

The Howard Paper Company, rbana, Ohio, announces the appointment of the Stanford Paper Company, Washington, D. C., as agent for Howard Bond and Paper Service, Inc., Buffalo, N. Y., as a distributer for Howard Bond and Howard Ledger.

Chain Drives in Paper Making

Silent and Roller Chain Applications

By Reginald Trautschold, Consulting Engineer

Those pulp and paper mills which are profiting most, now that business is definitely on the upgrade and rapidly getting better, are the same mills which, during the long trying period when orders were falling off day by day, instigated intensive efforts to put their plants in order and end wastes large and small—mechanical losses as well as those due to slack management and petty extravagances. The cost of power generation and of power utilization came in for exacting appraisal by these mills and the fact was driven home in many an establishment that relatively cheap power wastefully employed is in the long run a more costly situation than higher priced power economically and efficiently utilized.

In the investigation of mechanical inefficiencies, the chief wastes and unnecessary power expenses were almost invariably traced to the transmissions, or mechanical drives, employed between the power units and the production machines. That smooth, positive transmission of power which alone can assure uniformity in product and the utmost economy in machine operation was lacking in many instances, in others the frictional losses were excessive, though usually it was a combination of these two pernicious forms of mechanical waste which exacted the unduly high tolls, in machine deterioration and upkeep, as well as in power consumption.

Only one among a considerable number of paper mills using silent chain drives approached for opinions had any criticisms whatever of the modern silent chain drive and all, without a single exception, expressed satisfaction with the results secured in the various services for which the chain drives had been installed. This almost universal agreement is so unusual that the characteristic properties of silent chain drives must be especially well suited to the drive needs of cookers, Jordans, screens, cutters, calenders, driers, beaters, washers, pumps and the several parts of paper machines, in all of which these transmissions have set records of high efficiency, longevity and economy. The one criticism, incidentally, had to do with the initial price of the chain and the cost of its replacement.

Inherent Properties of Silent Chain Drives

The drives, with their positive tooth-to-tooth action, transmit full speed at all times, all slippage being avoided, and when correctly installed, running slack and adequately lubricated, they save considerable power. Their inherent mechanical efficiency is exceptionally high and journal friction, by virtue of the slackness of the transmission chain, is held at a minimum. Paper mill service records show ten, twenty and even thirty years of carefree operation, indicating their exceptional lasting quality.

One prominent Canadian mill reports still operating a beater shaft by a silent chain drive installed in 1911. A mill in Pennsylvania placed a 400-horsepower silent chain drive in heavy service and it was not until fourteen years later, when the original chain was replaced, that any repairs of any kind were necessary. Still another mill located in New England installed six silent chain drives on beaters and four on washers and over a period of ten years only one chain has had to be replaced, the other nine showing no signs of wear or loss of efficiency.

Drive centers are readily shortened or lengthened in silent chain transmissions and the drives can be made almost as compact as direct gear assemblies, the required spacing between driving and driven shafts being only that necessary for the sprocket teeth to clear. The flexibility of silent chains and the fact that they run slack, the driving tension automatically adjusting itself to the power demand, absorbs load shocks and protects the supporting bearings and machinery parts against rapid wear and consequent costly breakdown.

On all these counts there is universal agreement among the many mills which have installed silent chain drives, leaving for consideration only the question of costs, initial and replacement. In this connection, the experience of W. C. Hamilton & Sons, Miquon, Pa., is extremely pertinent, statistics having been carefully compiled at this establishment, on both beater and vacuum pump drives.

Saves $3,024.00 in Power Alone

Tests were conducted to determine the power consumptions of five beaters driven by silent chain transmissions encased in oil-retaining guards. It was found that the chain driven beaters, consumed 8 per cent less power and their higher efficiencies, moreover, were sustained over long periods. In fifteen years of continuous operation, 24 hours per day, the records for the respective drives of similar beaters motored by 125-horsepower units showed an aggregate saving of 756,000 kilowatt-hours, in favor of the silent chain drives.

At the low cost of power pertaining at this mill, *i.e.*, 0.4 cent per kilowatt-hour, this saving totals in the fifteen years to some $3,024.00. As the initial cost of the silent chain drive, including the casing, was a matter of $902.00, the drive was paid for by the savings in power three and a third times over during the fifteen year period.

Another example of the high ranking of silent chain transmissions in an important paper mill service at the same mill is in the case of a vacuum pump drive for the suction rolls. The pump is operated by a 40-horsepower motor, serving the 100-inch paper machine No. 1 through a silent chain transmission. The drive effects the speed reduction, 4.4 to 1, and the pump maintains a 10-inch vacuum across the respective suction rolls.

In this instance, the great economy of the silent chain drive is shown by its low first cost—and substantially low upkeep expenses. During sixty-eight months of service, the silent chain caring for the needs of the machine entailed in the way of maintenance only an annual changing of its lubricating oil supply.

Results such as these have led this mill to install thirty-six main silent chain drives during the period from 1920. This is of interest, as evidence of the dependence placed on silent chain drives at the Hamilton mill.

Beater Service Severe

The use of silent chain drives in beater service is in itself convincing evidence of their dependability and longevity, for in the words of the Riegel Paper Corporation, with plants at Milford, Riegelsville, Warrens Glen and Hughesville, N. J., "the service is severe as the beaters handle rags, rope and jute and the rolls get plenty of jarring." Incidentally, there are some eighty-three beaters and cookers equipped with silent chain drives in the several mills of this establishment, most of which have been in 24-hour operation, six days a week, for more than six years and have "never given a moment's trouble and not even the pins have needed replacement."

Thirty-five of the beaters contain rolls 48 x 48-inch and are driven by 1-inch, 7-inch face, silent chains from independent motors arranged with a motor on a short center directly in advance of a second motor on a long center. Thirty-six other beaters have 61-inch rolls of 54-inch face and these are driven by 1-inch, 9-inch face, silent chains, while eight beaters containing 61-inch rolls of 48-inch face are driven by 1¼-inch, 7-inch face, silent chains. The eight silent chain drives in the Hughesville mill, it might be added, were installed in 1926 and have never been replaced, which speaks highly for their economical operation.

Two of the paper machines operated by the establishment have their variable-speed shafts driven by short-center, silent chain transmissions and there are several other interesting applications of these chains in the various mills, one of which, on waxing machines, is particularly noteworthy. A center guide silent chain and two idling gears are used for the transmission of power from the motors and from the water cooling section to the wax melting compartment of high-speed, water-finish waxers.

This transmission arrangement drives the two cooling rolls in opposite directions and with maximum lap, due to the greater angle at which the rolls are staggered. Greater paper drying contact is thus secured and higher machine speeds can consequently be employed.

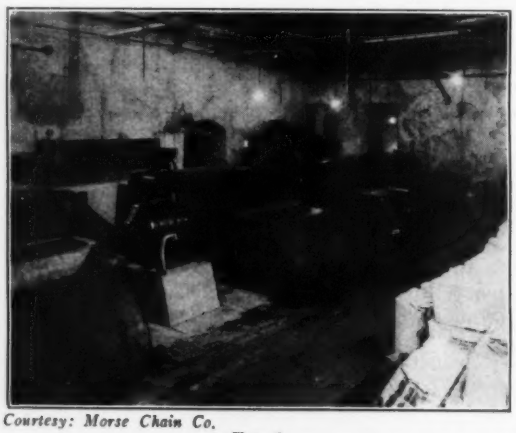
Silent Chain as Prime Mover

Another interesting silent chain application which has proved quite profitable is that on the waterwheel operating the Sweet Brothers Paper Company's mill at Phoenix, N. Y. It consists essentially of an encased 1½ inch pitch, 16 inch face, chain running on 137 and 23 tooth sprockets and transmits 325 horsepower from the low speed (120 r.p.m.) waterwheel shaft to the mill's main generator.

It is held that this drive is operating at a sustained efficiency of 98.6 per cent and actually delivering 33⅓ per cent more power to the dynamo than did the former transmission. The only upkeep expense to date has been an occasional replenishment of the lubricating oil supply and at the high transmission efficiency maintained there is no indication of chain wear or deterioration. At another New York mill, where a similar silent chain transmission application was made, a saving of approximately $25.00 a day is said to be realized.

Paper Mill Reports

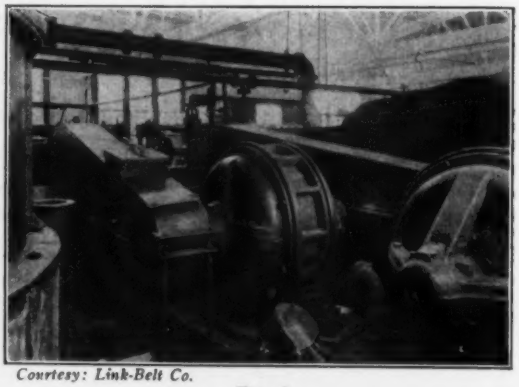
The Tarentum Paper Mills, Tarentum, Pa., report: "we are pleased to say that we have had several (silent) chain drives in use in this mill for the last twelve years.



Courtesy: Morse Chain Co.

FIG. 1

100 hp. synchronous motors with extended shafts, set between beaters, drive units in pairs through short center, silent chain transmissions.



Courtesy: Link-Belt Co.

FIG. 2

Compact arrangement of silent chain driven beaters in eastern mill have given 8 to 9 years of carefree service.

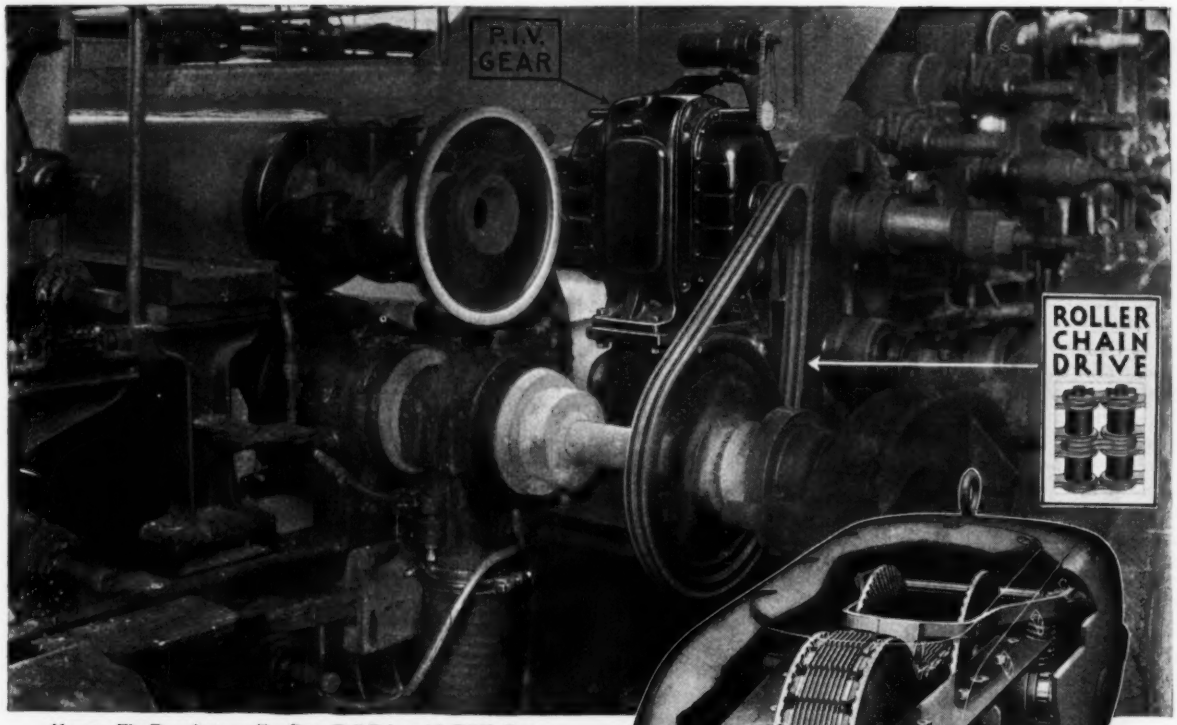
They have performed very satisfactorily and the upkeep on them is practically nothing. We think so much of the drives that we are at this time (August 25, 1936) installing six of them on our beaters."

Silent chain transmissions are employed on the main drives of the paper machines, as well as on beaters and suction pumps, and "on all other machinery where possible to install them" by the Rockland Paper Company, Rockland, Del. This concern further states: "We find they are very satisfactory as there is no slipping and the power loss from friction is held at a minimum. The maintenance cost is low, for when properly installed a little lubrication once a week is all that is required."

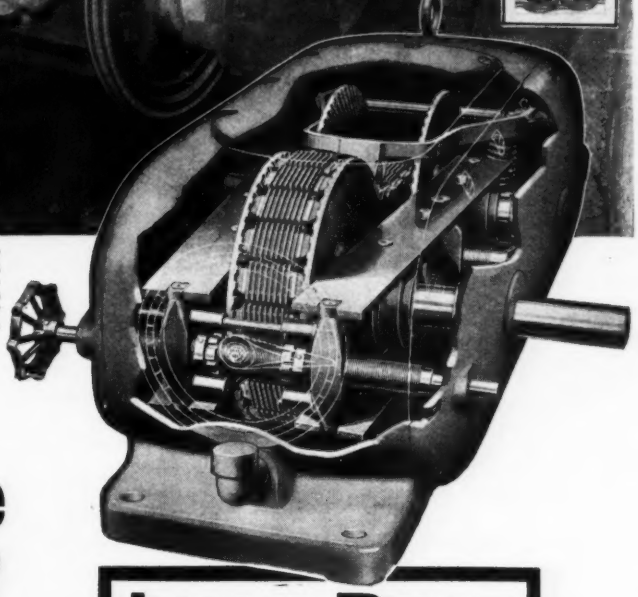
A prominent mill in West Virginia, which installed twenty-seven silent chain drives on its paper mill beaters about a year ago, reports: "so far, (these drives) have given perfect satisfaction" and adds: "It is our belief that this type of drive is entirely satisfactory for this type of application." In view of the short time these drives have been in service, however, these remarks, while of interest, would not be particularly noteworthy but for the saving realized in power consumption by virtue of the change from group to direct beater drive. To quote: "these beaters were originally driven from four lineshafts located in the basement and belted to the beaters. This arrangement made it very difficult to shut down one beater while the others were in operation and, of course, if one of the large lineshaft motors burned out, a large portion of our beater capacity was out of service. While the individual drive was justified purely on the basis of convenience, we have noticed since installation was made that a large number of the beaters are usually standing idle, whereas under the old arrangement they were operating even though without stock."

While no definite figures are available to show the relative loads carried when driving the beaters loaded and empty, it is held that the load when empty is only about 20 per cent less than when fully loaded. Every idle beater is thus refutable evidence that substantial conservation of the power supply is being realized.

Applications of silent chain and modern variable speed transmissions to the highly perfected cutters demanded for economically filling orders hold the variation in sheet length within 1/16-inch on long sheets and even less on short sheets. Positive lineshaft drives are secured at a number of mills through silent chain transmissions connecting the actuating motors with the power shafting and there are numerous other efficient and economical applications to drives of auxiliary as well as main paper making equipment.



Above: The Downingtown Top Press Roll Drive with P.I.V. Gear positive infinitely variable speed control and Silverlink roller chain drive. Instantaneous adjustment of top roll to the exact speed required in its relation to the bottom roll, assured with or without rolls in contact and regardless of weighting, thickness of sheet, diameter or age of rolls, type or style of felt, or whether or not a top felt is used.



Positive Infinitely Variable SPEED Control

● Infinite variation—fractional-revolution speed changes made and maintained with micrometer precision. Tooth-to-tooth contacts of its unique drive chain with conical wheels, do not permit slip. Compactness and flexibility of application are other outstanding features of the P.I.V. Gear. It is available for horizontal and vertical mounting of the basic unit; also motorized, and with gear reduction sets. Can be arranged for manual or automatic operation. Send for Book No. 1574. Address Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, Toronto, or any of our offices located in principal cities.

9327

LINK-BELT P I V GEAR

LINK-BELT positive DRIVES INCLUDE

As for replacement costs, this form of mechanical transmission medium can be easily and cheaply changed with minimum disturbance to machinery and other transmission members. There need be little or no dismantling of equipment, of disalignment of bearings or shafts, or time consuming adjustments when making any entailed substitutions.

Modern Transmission Chain Efficiencies

This high ranking on every important count, on transmission effectiveness, longevity, flexibility and economy, is due to the mechanical efficiency of modern silent and roller chains, coupled with the mechanical precision of their carrying sprockets.

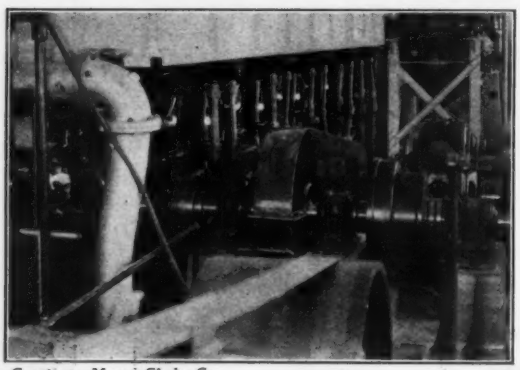
An explanation lies partly in the fact that there is more rolling and less sliding action developed in chain transmission and partly because of the greater distribution of strain and reduction in intensity of load impact—in accurately proportioned chain drives. Full advantage of these conditions is dependent, however, upon constructional refinements of the highest order in the production of the chains and sprocket wheels and to quite as great extent upon niceties of drive installation and provisions for the maintenance of satisfactory operating conditions.

While the paper mill can only influence the constructional refinements indirectly, by insistence upon the best, the installation of the transmissions and their care are considerations for which the mills are individually responsible. These latter have to do mostly with facilities provided for suitable chain lubrication, chain tension adjustment and accuracy in all drive alignment.

Lubrication Requirements

The requirements for automatic lubrication usually call for enclosing the chain in an oil-tight casing, which also serves as a valuable safety-guard, and the provision of some suitable method of supplying an adequate and uninterrupted supply of good grade engine or motor oil of medium viscosity. The necessary lubricant, in view of the large oil carrying capacity of modern transmission chains, can readily be provided by drip, splash (disc or ring type) or pump feed, rather than by running the chain through a lubricant bath. In fact, excess oil should always be drained from the casing before the lubricant level reaches the lowermost strand of the chain.

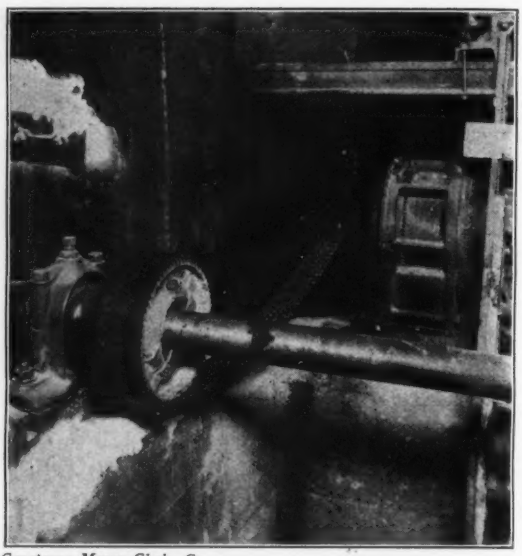
In the case of splash lubrication, the immersion of the disc or ring should be watched carefully and fresh oil added from time to time, to maintain the proper lubricant level. In pump lubricating systems, a free and limited flow of oil is the chief requisite, to assure uninterrupted lubrication with due regard to lubricant economy. In closed lubrication circulation systems, periodic changes of oil should also be made.



Courtesy: Morse Chain Co.

FIG. 4

Silent chain drive on drier section in eastern paper mill.



Courtesy: Morse Chain Co.

FIG. 3

Silent chains drive alternators which synchronize the speeds of dry end and wet end motors of paper machine.

Chain Tension Adjustment

The high transmission efficiency and longevity of silent and roller chain drives are also influenced to a marked degree by the tension on the chain. The chains should always be run slack, for in chain drives the load is carried by the sprocket teeth and is not dependent, as in belt transmissions, upon the difference in tensions carried on the drive and slack runs, or sides. In properly adjusted chain drives, any tension on the slack side, other than that created by the weight of the chain or unavoidably imposed by centrifugal action, is distinctly detrimental to drive efficiency and longevity, unduly aggravating journal friction and link wear in chain flexure. The valuable shock absorbing properties of a slack running chain drive are also sacrificed if the drive is allowed to run tight and machinery upkeep is made much more expensive, to say nothing of increased power wastes and more rapid transmission deterioration.

Where chain transmissions are run vertically, the per-

Courtesy: Link-Belt Co.

FIG. 5

30 hp. silent chain transmission operates drier drum at Wisconsin paper mill.

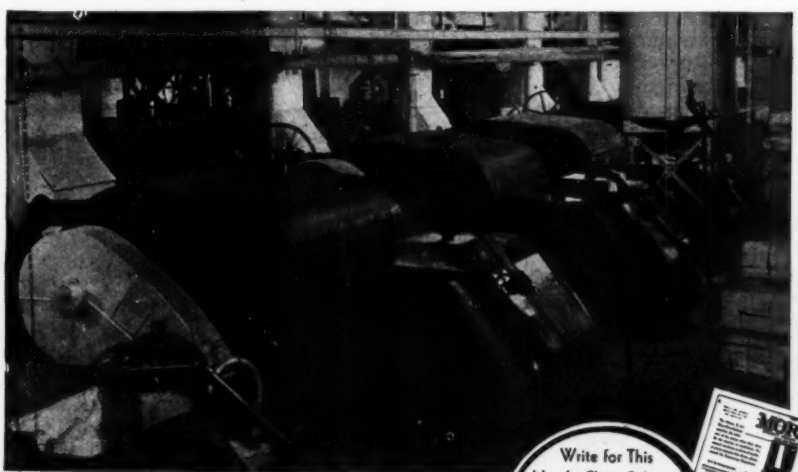
T.N.T. (Teeth Not Tension)

Blasts Power Lo$$e$ Right Out of Your Plant

As effectively as real T.N.T. blasts open the log jam in a spring drive, the T.N.T. (Teeth Not Tension) of Morse Silent Chain Drives "blasts" needless power losses out of your paper mill.

The powerful, positive teeth of Morse Chain Drives grip and hold the teeth on pinions and sprockets firmly. Morse Chains cannot stretch or slip. They cannot waste power. Morse Positive Drives transmit power 98.6% efficiently. Morse Drives help paper manufacturers maintain production schedules, eliminate breakdowns and reduce maintenance expense.

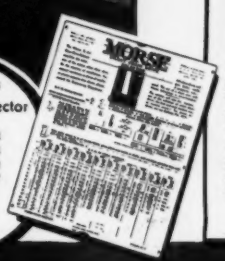
You, too, can step up production efficiency, wipe out costly shut-downs and "blast" needless power losses from your mill by replacing old-fashioned, vibrating, slipping drives with Morse Positive Drives. Call the Morse man near you, or write to us in Ithaca.



In paper mills all over the country Morse Drives are quietly, safely, and efficiently transmitting power from motors to agitators and drier drums, beaters and super calenders, pumps and jordans, cutters and generators. Day after day, year after year, these outstanding performers transmit power efficiently with seldom a shut-down for repairs—with seldom a replacement.

Write for This Handy Chain Selector

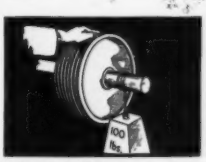
This handy chain selector tells you how to select the right chain for the job. It is yours for the asking.



The Sound Principle Behind MORSE CHAIN DRIVES

It is easy to grip and turn a toothed sprocket. Teeth, not tension, do the trick. The teeth in Morse Chains, too, grip and hold and cannot slip.

It is difficult to get a good grip on a smooth-faced wheel.



It is even difficult to get a good grip on a grooved wheel—but the powerful teeth of Morse Chain Drives grip and hold the teeth on pinions and sprockets firmly and positively. They cannot slip. They cannot waste power.

MORSE *positive* CHAIN DRIVES

MORSE CHAIN COMPANY ITHACA N. Y. DIVISION BORG-WARNER CORP.

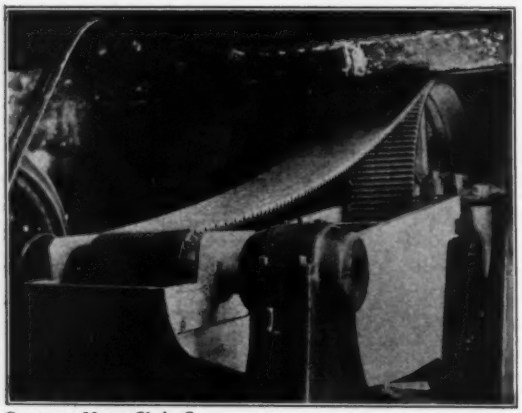
missible chain slack is of necessity less than in horizontal drives, else there might be danger of the chain falling away from the lower sprocket as the pin and link wear elongate the chain. Consequently, unless the drive is short, the installation of a shoe or idler on the slack side is advisable in vertical chain drives, serving as a precaution as well as permitting the use of slightly longer chains. Also, the lower sprocket should be provided with as many teeth as possible.

Good Alignment Essential

The most important requirement for carefree chain drive operation is, however, accurate alignment of all shafts, bearings and rotating machine parts. It is the unbalanced and eccentric strains on the multiplicity of journals, pin and shaft bearings, which create most of the destructive friction reducing transmission efficiency and cause undue deterioration of transmission and machinery. Proper lubrication and correct chain tension, important as they are, can at best only retard, or slow-up, the resulting wear. The life of a chain drive and the many advantages making for sustained high-efficiency and attainable low-upkeep are more dependent upon precision in alignment of all functioning parts, bearings, shafts, links and pins, than anything else.

This essential of precision in alignment applies to the chain and sprocket constructions as well as to the installation of the drives and goes far in establishing merits of the chain, sprockets and other transmission members and details for which the drive manufacturer alone is responsible. A fact which adds to the importance of selecting only those chain drives which are produced under exacting standards of precision in manufacture—standards which are so high that the loss between power input and output has been held within 1½ per cent under actual transmission service conditions.

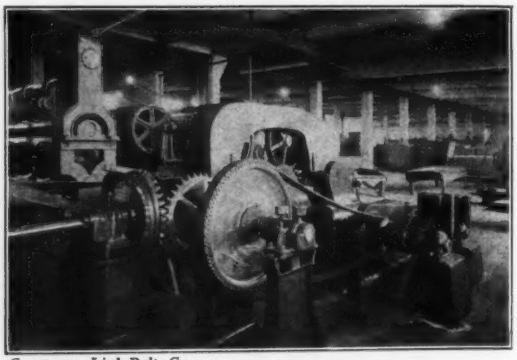
Accuracy in alignment is also relatively more important in short than in long chain drives, where the palliative influence of the chain flexibility is necessarily less than when there are more numerous chain links, while a further precautionary measure of especial value in short drives is to make the connection between the transmission assembly and the power unit through some form of approved flexible coupling. These connecting links serve to increase the cushioning effect of the chain and to retard both the machine and driving mechanism deterioration brought about by small and unavoidable inaccuracies in machine and transmission alignment.



Courtesy: Morse Chain Co.

FIG. 7

Silent chain transmits 325 hp. from water-wheel to generator, on 133-inch centers at high sustained efficiency.



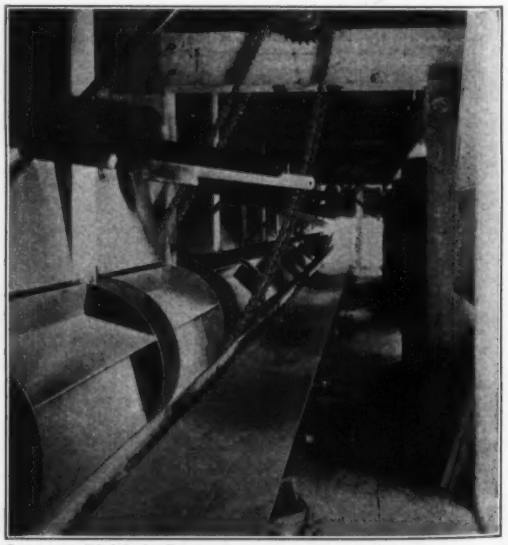
Courtesy: Link-Belt Co.

FIG. 6

Silent chain, variable speed gear, clutches and flexible couplings form positive variable speed drive for paper board cutter at mid-western establishment.

The essentials for securing long, carefree life with silent chain drives are just as pertinent for securing satisfactory service with modern roller chain transmissions. The latter, while quite capable of operating efficiently at relatively high speeds, at shaft speeds of 4,000 r.p.m. and even higher, are more commonly employed for intermediate, built-in-drives and in similar and moderate speed applications. The chains are somewhat cheaper than the tooth formed silent chains, yet are capable of developing substantially the same high, well-sustained transmission efficiency and while not as quiet in operation are nevertheless smooth-running and even more flexible, being able to flex with equal facility in either direction. This latter property, the chains being reversible as well, permit the transmission chains to be wound back and forth over a series of sprockets and change the direction of rotation without appreciable sacrifice in transmission efficiency.

The same high standards in accurate manufacture of chain and sprockets characterize the modern roller chain transmission assemblies—precision chain, properly lubricated, running about well-balanced, cut-sprockets carried on closely fitting shafts, turning in properly aligned bearings. The chains not only flex both ways, but are of great-



Courtesy: Link-Belt Co.

FIG. 8

Roller chain drives rotary feeders for reclaiming chips from bin to belt conveyor systems feeding digesters.

er comparative strength and lighter in weight than silent chains of like proportions. They also cushion shocks of sudden load fluctuations and assure positive velocity ratios at all times.

The mill which placed the 400-horsepower silent chain drive in service which ran fourteen years before the original chain was replaced also installed a roller chain drive in 1913 which has operated at high efficiency almost continuously to date, without any replacements or repairs of any kind. Commenting on this record, the mill stated a year or two ago: "These drives have given excellent service over a period of twenty years at a very low cost of operation and maintenance."

From this well authenticated survey of chain drive attainments in pulp and paper mill services, it certainly seems these transmissions can be used to decided advantage in many applications in any mill. Their records, where the drives are suitable and well-cared for, leave little attainable improvement. They have been tried and tested under almost every conceivable situation and condition of service and have well earned the attention of all mills striving to cut power wastes, reduce operating expenses and improve quality of product. Admittedly, they are not cure-alls for all power transmission ills, nor are they always to be preferred to other efficient forms of transmissions, but few mills can afford today to overlook their possible adoption in one or another of the many service applications for which economical, positive, flexible and long-lived mechanical transmissions of high efficiency, requiring little attention and entailing negligible upkeep expense, are desirable assets.

Paterson Parchment Sells Modena Plant

COATESVILLE, Pa., October 26, 1936—The Modena plant of the Paterson Parchment Paper Company has been sold. This announcement was made by officials of the company at its headquarters in Bristol. What the future of the plant will be was not announced.

"All I can say," an official of the Paterson company said, "is that the property has been definitely sold. We have been asked by the purchaser not to disclose his identity at this time. Also we are not at liberty to discuss his future plans."

For more than two weeks past there have been rumors in Modena that the property had been sold and that the sale will mean that the mill will be placed in operation again. Also there have been rumors that the plant might be torn down for salvage purposes.

It is expected that the purchaser will reveal his identity and announce his plans within a short time. Until that is done nothing will be definitely known regarding the future of the property.

New Great Northern Installations

The Great Northern Paper Company is installing new fourdriniers on two Rice, Barton & Fales 158-inch paper machines at East Millinocket, Maine.

A 775 h.p. Babcock & Wilcox cross drum boiler, with superheater, air preheater and Taylor stoker, is being installed to replace three old units. In connection with this boiler a new Cochrane hot well and feed water heater are being installed.

At Seboomook, Maine, on the West Branch of the Penobscot River a concrete dam, 426 feet long between abutments and approximately 50 feet high, is being built to replace an existing timber crib dam. The new dam will impound a lake more than twelve miles long and a mile and a quarter wide.

Dr. Rees Talks to New England TAPPI

In the report of the meeting of the New England Section of the Technical Association of the Pulp and Paper Industry held at Lenox, Mass., October 17, 1936, and published in the PAPER TRADE JOURNAL last week, the following summary of Dr. Rees' remarks was omitted. Dr. Rees' topic was "Papermakers' Felts."

Dr. Rees stated that the process of papermaking is one of preparing a suspension of cellulose in water and then removing the water from this suspension and forming during this process a relatively dry sheet of felted cellulose fibers. The job of the papermaker's felt is to remove water from this cellulose sheet during certain stages of the papermaking process.

He mentioned that the idea has always existed that the water was sucked out or absorbed from the sheet but this theory has been found inadequate as it does not explain what occurs at the nips of press rolls. In general, the matter of water removal has been explained by the simple principles of pressure and filtration.

Dr. Rees' talk was illustrated with many slides showing charts and photomicrographs of paper and felt surfaces. Charts showing nip conditions that exist at an ordinary press; the distribution of pressure at the nip; the performance of a first press felt and suction first press felt on a newsprint machine, were also included.

It was also stated that in removing water it is, of course, necessary that a certain finish be obtained and the felt exerts a great bearing on this result. It is, therefore, important to design felts so that they may impart a degree of smoothness and a minimum degree of roughness to the sheet surface. The best finish felts are those that impart impressions to the sheet most readily smoothed out by the later felts and finally ironed out by the smoothing press and calenders.

In order that a felt may perform its two jobs of water removal and finish it is necessary for the felt to run under certain mechanical stresses and strains. It must pull the load of the machine; must resist some frictional wear, must withstand the pressure exerted on it and also resist a certain amount of chemical deterioration. All of these qualities might be grouped under the heading of durability and toughness. The problem of felt design and the adjustment of the proper balance between the three basic qualities—openness, finish and durability requires detailed study and information from each condition so that the amount of durability and toughness that can be built into the felt depends upon the necessity for the other two basic qualities —finish and openness. The most important step is for the papermaker to secure the proper balance in design of felt for a particular job—a felt that is balanced with the proper compromise between openness and finish and life. This is the felt that produces the highest quality of finished product.

Dr. Rees stated that close co-operation between the felt maker and the papermaker is necessary to secure a particular felt. The felt maker should be allowed to study the conditions and obtain all the necessary information that he needs in planning his felt for this condition.

An interesting discussion followed Dr. Rees' paper.

Hydroseal Pumps

The Allen-Sherman-Hoff Company, Lewis Tower, Philadelphia, Pa., has just issued a very attractive catalogue of 24 pages describing its line of Hydroseal pumps. Interested individuals or concerns may obtain a copy of that catalogue gratis by applying to the company.

British Columbia Pulp & Paper Co. Makes Extensive Improvements at Port Alice

During the past few years the mill production at the Port Alice plant of the British Columbia Pulp and Paper Company has been stepped up 500 tons per month with a consequent reduction in operating costs.

Thorne Barker

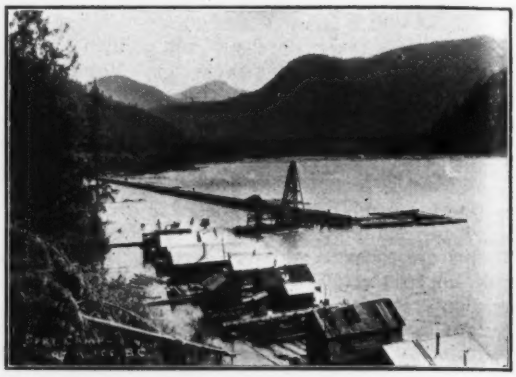
The first large expenditure was made in connection with the installation of the Thorne barker which is the only one on the West Coast and the largest machine of its type constructed. This machine is capable of turning out sufficient wood in nine hours to keep the pulp mill supplied with chips for twenty-four hours, and saves wood which

THORNE BARKER AT PORT ALICE, B. C.

otherwise would be wasted in saw kerf and knife barker operations.

Two-Stage Bleaching

The grade of the product has been improved through the installation of two-stage bleaching system and screen room changes. The new bleaching system has been in operation almost two years.



VIEW OF LOGGING CAMP UNDER CONSTRUCTION, SOUTH-EAST ARM, QUATSINO SOUND

Chemipulp Process

Early in 1936, complete installation for Chemipulp Process was installed and the mill has profited more by this improvement than any other which has recently been made. The increase in production is chiefly due to Chemipulp through increased yield, more uniform cooking and consequent easier screening. Due to the hot acid installation there has been an appreciable saving in steam and the steadying up of the steam demand of the cooking process has assisted the boiler house materially, maintaining a more uniform load on the boilers.

Acid Plant

In order to take care of increased tonnage it was found necessary to install a larger gas fan and supply additional cooling surface to cool the sulphur dioxide gases before absorption in limestone towers. This installation together with the hot acid recovery system allows the maintenance of a high strength acid which in turn is a benefit to the strength properties of the product.

Water

Early in this improvement program it was found essential to augment the supply of water from Victoria Lake

PLANT OF THE BRITISH COLUMBIA PULP & PAPER CO., PORT ALICE, B. C.

6 NEW MILLS

and — as always news of new mills is news of the

ROSS SYSTEMS

During 1936 the following mills have been completed or are now in the process of construction—and will provide a greater measure of efficiency and economy in paper production

UNION BAG & PAPER CORPORATION
SAVANNAH GA

CROSSETT LUMBER COMPANY
CROSSETT, ARK

CHAMPION PAPER & FIBRE COMPANY
HOUSTON, TEXAS

WEST VIRGINIA PULP & PAPER COMPANY
CHARLESTOWN, S C

ST JOE PAPER COMPANY
POINT ST JOE FLORIDA

CONTAINER CORPORATION
FERNINDINA FLA

Just as in every major development of the paper industry in the past, Ross engineers along with consulting and operating engineers will be entrusted with the job of equipping modern mills to insure trouble-free, profitable production. Ross equipment furnished or on order consists of:

MACHINE ROOM VENTILATION

HOODS and EXHAUST SYSTEMS

GENERAL MILL HEATING and VENTILATING

J. O. ROSS ENGINEERING CORPORATION

Main Office—350 MADISON AVE., NEW YORK, N. Y.

201 North Wells St. CHICAGO

12953 Greeley Ave. DETROIT

2860 N. W. Front Ave. PORTLAND, ORE.

(which is noted for its constant purity) and this was taken care of by the replacement of former pumps by three modern Allis Chalmers pumps of high efficiency and greater capacity. In addition to the new pumps the water system received a general overhaul.

Preheated Air—Hog Fuel Conveying and Storage System

At present there are two large installations under way:—Preheated air to dutch ovens and hog fuel conveying and storage system, involving an expenditure of approximately $100,000.

Owing to the high cost of fuel oil, the use of hog fuel will show an appreciable saving in fuel costs. It is the intention to convert dutch ovens to burn wood fuel and eventually eliminate the use of fuel oil altogether. Preheated air will be beneficial to combustion particularly with the burning of wood fuel. In conjunction with the installation of preheated air, cinder precipitators are being erected.

The hog fuel system consists of: Dock—300 feet long, jetty—100 feet with steel off-loading boom. The conveyor direct from jetty to boiler house is approximately 600 feet long and the return to storage about 400 feet; the steel conveyor in boiler house is 140 feet long. The supporting structure is of timber, tower and truss construction, about 60 feet in height, all equipped with Link Belt Conveyor equipment. It is estimated that the storage space will take care of 4,000 units of hog fuel with considerable leeway for additional storage and that the conveyor will handle 40 units per hour. The fuel will be delivered to the plant in large barges containing their own discharging equipment. These barges carry up to 1,900 units of hog fuel.

Accommodation for Employees

Owing to increase of labor it was necessary to provide additional accommodation for employees and to cope with this situation, one residence, two duplex houses and three apartment blocks all of modern construction, were built to house families of the married workers; in addition to these, a well furnished rooming house was erected to provide accommodation for single men.

Woods Department

The logging operations which are at present located in the West Arm of Quatsino Sound, some 45 miles from the pulp mill, are being transferred to the head of the South East Arm adjacent to the plant. Construction of truck roads, log wharf, booming ground and camp site are well under way at this new location. Deliveries of logs from the new limits should begin early in 1937, and the proximity of these logging operations will facilitate log deliveries and reduce towing costs.

HOG FUEL CONVEYOR UNDER CONSTRUCTION

CHEMIPULP ACCUMULATOR BUILDING

Nash Hytor Cone-Type Vacuum Pumps

Nash Hytor Cone-Type Vacuum Pumps are being used in increasing numbers throughout paper and pulp mills in all parts of the world. Important improvements in efficiency have been made since the inception of the "cone design" a few years ago and current research promises even better results. These pumps are now manufactured in Canada, Great Britain, Sweden and Australia and are standard equipment in the paper mills of these countries.

The "Cone Type" pump while incorporating all of the advantages of the older "straight sided" hytor permits of much higher efficiencies because of the larger port areas possible and their better location with respect to the air and water travel. Turbulence and cavitation of the sealing water is largely eliminated. Research correlated with full scale tests in one of the most modern pump testing laboratories in the country have led to better design of rotor blade shapes and more efficient curvatures of the lobe.

Nash vacuum pumps will handle suction boxes, couch and suction presses on the new machines of the Champion Paper and Fibre Company at Houston, Texas, the Crossett Lumber Company at Crossett, Ark. and the West Virginia Pulp and Paper Company mill at North Charleston, S. C. In these same mills Nash pumps have been selected for lime sludge filters and pulp washers and thickeners. Beside these new projects Nash "Cone-Type" pumps have been applied recently on several hundred suction presses and suction drum rolls throughout the fine paper and board mills of the United States. The rolls on board machines operate generally at vacuums between twenty and twenty-four inches of mercury with very moderate amounts of power necessary for vacuum pumps.

Jennings Drier Exhaust pumps are finding many applications both on old and new machines. A special drainage pump incorporating a separate hot condensate pump to handle returns from flash tanks has been developed for the improved Mid-West Fulton drier return system. This system and pump are being installed on the Crossett machine. A Jennings pump will serve the Champion machine at Houston as well as several at Hamilton, Ohio.

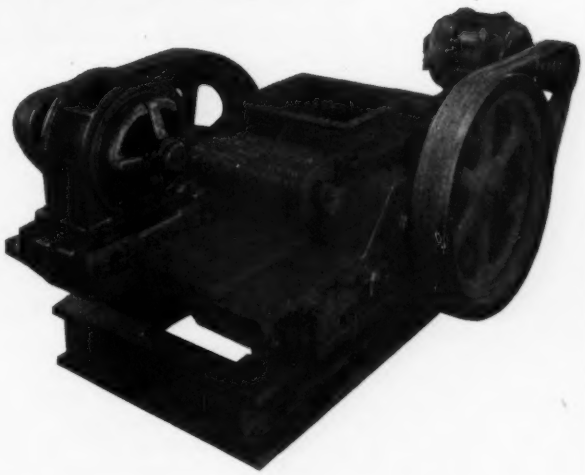
CLEAN PULP

with this equipment in your mill

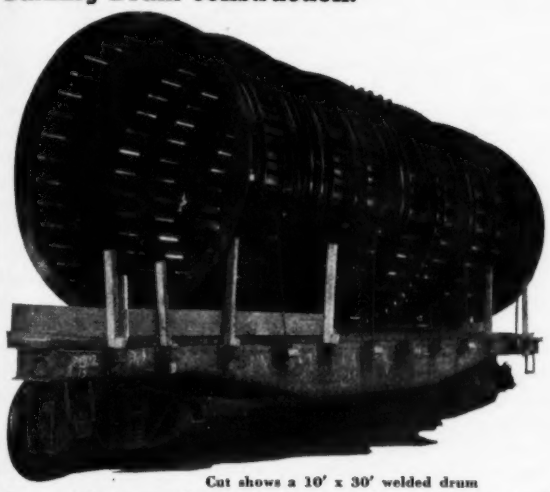
NEKOOSA UNIFORM CHIP CUTTER

The Nekoosa Uniform Chip Cutter is used to cut oversize chips to a uniform size. This facilitates cooking as long or oversize chips are not penetrated uniformly by the liquor in the digester.

Chips from the Nekoosa Chip Cutter do not need to be rescreened. This enables you to make a definite saving over the use of old-fashioned chippers or crushers which break up the oversize chips into uneven chips and make a lot of sawdust.



WELDING has revolutionized Barking Drum construction.



Cut shows a 10' x 30' welded drum

For the past two years we have been using electric welded construction in the fabrication of barking drums. During that time we have built 24 welded U-BAR drums—every one of which has given perfect satisfaction.

Do you know what this means to the pulp and paper industry? It means that a welded barking drum is one complete unit, with no bolted or riveted joints to work loose under heavy service. By eliminating the tightening and replacement of bolts and the re-riveting of joints, welding has reduced repair bills more than any other recent improvement.

The U-BAR barking drum also has other obvious advantages. It will bark more wood and do a better job than a drum with a smooth interior because it provides a tumbling instead of a sliding action. It can be operated at a higher speed than a trunion driven drum due to the even distribution of the load in the chain suspension drive and the shock absorbing spring take-ups. Write for a list of installations and investigate the performance of welded U-BAR drums.

F.M.P. COARSE SCREEN AND KNOTTER

The F.M.P. Coarse Screen is more than a knotter due to the fact that it has smaller perforations than the ordinary type of equipment used for this purpose. This enables you to shut down some of your fine screens or install plates with finer perforations and improve the quality of your pulp.

The F.M.P. Screen removes slivers, knots and particles of dirt at the beginning of the process. It operates with a rolling motion which does not break up the foreign particles nor force them through the perforations with the clean pulp. The rejects are, however, retained by baffles until all good fibres are recovered.

The rotating drum of the F.M.P. Screen is supported at one end by overhead rollers and at the other by a journal which is connected to a motor by a speed reducer. The screen plates can be removed without disturbing any other part of the equipment.

The power requirement is less than 2 h.p. for a screen with 3/16" perforations and a capacity of 100 tons of groundwood or 50 tons of chemical pulp in 24 hrs.

FIBRE MAKING PROCESSES, INC.

TRIBUNE TOWER, CHICAGO, ILLINOIS

Imperial Paper & Color Corp. Installs Two 50,000 lb. Per Hour High Efficiency Units

Steam was formerly generated at the plant of the Imperial Paper and Color Corporation at Glens Falls, N. Y., from a number of hand fired HRT boilers; the permissible operating pressure had been lowered a number of times. One of the main reasons for installing new modern steam generating equipment was the fact that another pressure cut would make it impossible for the Imperial Paper and Color Corporation to operate their engines and would cause excessively low pressures at the outlying points of the plant.

Further, the operating efficiency of the old hand fired HRT boilers was so low that it was apparent that large sums of money could be saved through the installation of more high efficiency generating units. After the executives of the Imperial Paper and Color Corporation definitely decided upon the installation of new boiler equipment it became necessary for R. W. Buckley, chief engineer, to thoroughly investigate the different types and combination of equipment suitable for the particular requirements at this plant and to decide upon that equipment which would show the greatest return on the required investment.

Fired With Traveling Grate Stockers

Mr. Buckley was confronted with the possibility of reinstalling new horizontal return tubular boilers fired by side dumping stokers, installing modern steam generating units fired by pulverized coal, or installing modern boiler units fired by traveling grate stokers to burn No. 3 buckwheat anthracite coal. After a very careful study of all of the factors involved, it was finally concluded that due to the favorable price of No. 3 buckwheat delivered to his plant modern boiler units fired with traveling grate stokers would pay for themselves faster than would the other types of units under consideration.

The units will be operated at the present time at a steam pressure of 130 lbs., however, the steam generating units have been built for an operating pressure of 300 lbs., as it is proposed to install in the future new power generating equipment which will make it advisable to operate at the higher pressure. The steam generating unit has also been designed so that a future superheater can be applied to it by merely installing the superheater elements in the space provided for them in the tube banks o fthe boiler.

Although Mr. Buckley, the engineer of the plant would rather have installed three units than two, building space and certain other complications due to changing from one type of equipment to another, made the selection of two units seem more feasible at the present time. This condition, however, necessitated the selection of equipment which would give absolute reliability in operation with an absolute minimum of shut-downs due to operating difficulties.

Ring Flow Circulation Type Selected

After a very careful investigation of the different types of boiler equipment offered at the present time, Mr. Buckley selected boilers of the well-known ring flow circulation type. The boiler selected was a 4-drum bent tube boiler having a 48 inch steam water drum, two 42 inch diameter submerged drums, and one 30 inch diameter dry steam drum. The overcomer tubes connecting the steam water drum and the dry steam drum assures dry and slightly super-heated steam at the different rates of steam generation. It was decided to use solid refractory furnaces, the side walls being 22½ inches thick, and the front wall 18 inches thick.

In order to efficiently burn the small sizes of anthracite coal a traveling grate type of stoker was selected. The stokers are motor driven through variable speed transmission. The stoker is a forced draft traveling grate type, 10 feet wide by 16 feet, 11 inches long. Stoker is divided lengthwise into six air zones or compartments to permit the use of forced draft air under different pressures throughout the length of the stoker.

Header Type of Economizer Selected

In order to operate at high efficiencies it was decided that either an air heater or an economizer should be installed in connection with the boiler equipment. After a very careful study of these two pieces of heat recovery equipment it was decided that the header type of economizer was best suited for the installation, both from an operating and financial standpoint. The header type economizer installed was arranged with ten rows of tubes in width by fourteen tubes high. The economizer is of sufficient size to increase the temperature of the feed water from 210 deg. to 268 deg. resulting in an efficiency increase at the 50,000 lbs of steam per hour rate of 4½ per cent.

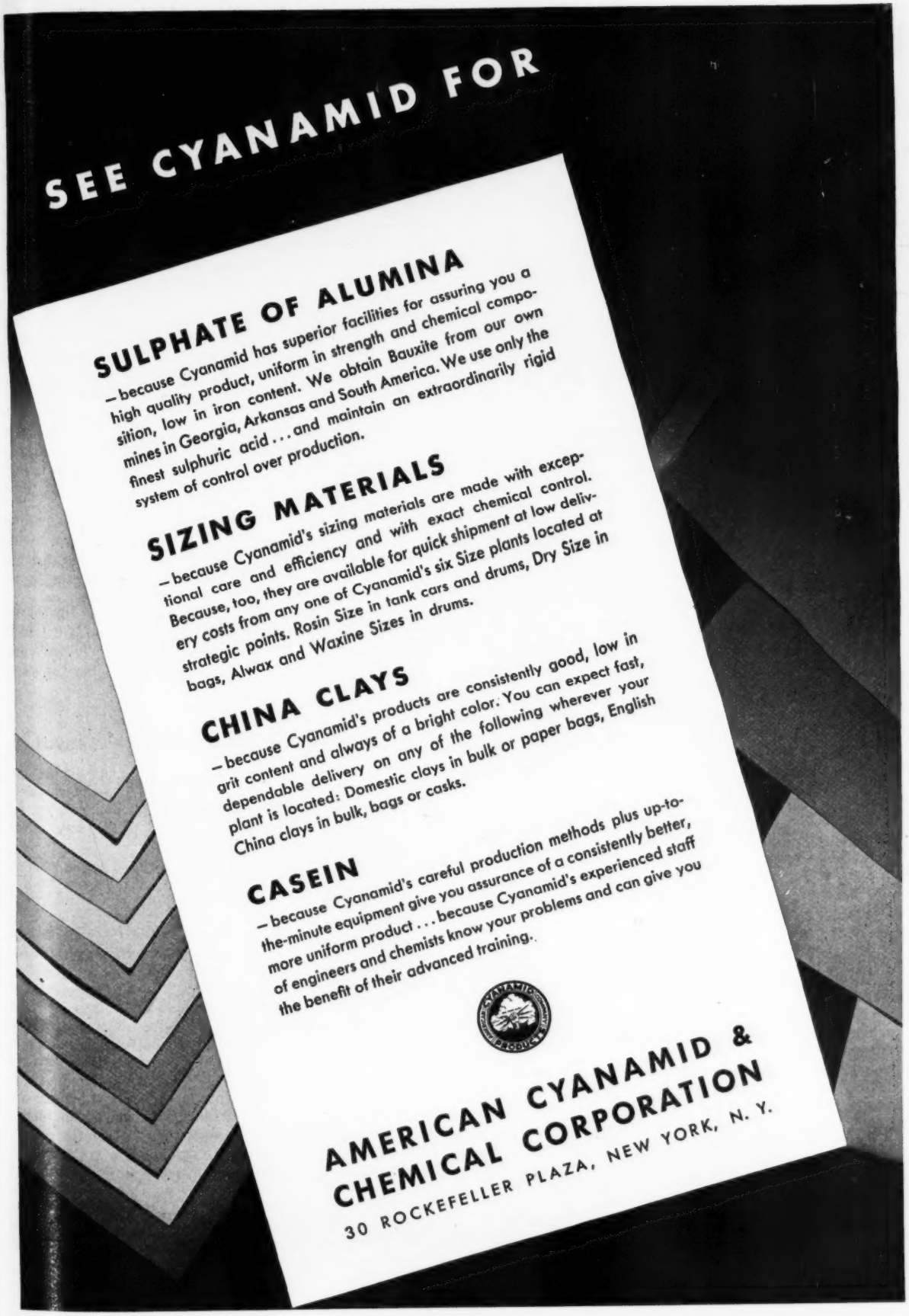
Motor driven forced draft and induced draft fans were installed. The forced draft fan is equipped with vane control inlet dampers.

Automatic combustion control has also been installed to automatically regulate the variable speed drive at the stokers and the vane control dampers on the forced draft fan. Furnace draft regulators have also been installed to maintain a constant slight negative pressure within the boiler furnaces. The control system will automatically regulate the rate of fuel and air supplied to the stoker so as to closely follow any and all fluctuations in plant steam demand and will hold the main header pressure within desirable limits throughout the whole boiler load range.

Engineering Data of Interest

The following engineering data will be of interest:
Boiler heating surface—6,000 square feet.
Economizer heating surface—1,600 square feet.
Furnace width—10 feet.
Heat release at maximum capacity—54,000 Btu.
Temperature of exit gases from economizer—420 deg.
Operating efficiency—78.5 per cent.
Fuel—No. 3 buckwheat anthracite coal.
Moisture—3 per cent.
Volatile matter—4.05 per cent.
Fixed carbon—79.65 per cent.
Ash—13.3 per cent.
Btu. as fired—12,000.

In order to install the unit in the existing power house it was necessary to raise the roof of the present plant. The units were installed and the existing units removed without interruption of the plant operation. This necessitated the installation of the new units under quite adverse erection conditions; however, the entire program was ex-


SEE CYANAMID FOR
SULPHATE OF ALUMINA
—because Cyanamid has superior facilities for assuring you a high quality product, uniform in strength and chemical composition, low in iron content. We obtain Bauxite from our own mines in Georgia, Arkansas and South America. We use only the finest sulphuric acid . . . and maintain an extraordinarily rigid system of control over production.
SIZING MATERIALS
—because Cyanamid's sizing materials are made with exceptional care and efficiency and with exact chemical control. Because, too, they are available for quick shipment at low delivery costs from any one of Cyanamid's six Size plants located at strategic points. Rosin Size in tank cars and drums, Dry Size in bags, Alwax and Waxine Sizes in drums.
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—because Cyanamid's careful production methods plus up-to-the-minute equipment give you assurance of a consistently better, more uniform product . . . because Cyanamid's experienced staff of engineers and chemists know your problems and can give you the benefit of their advanced training.
AMERICAN CYANAMID & CHEMICAL CORPORATION
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ecuted in accordance with pre-arranged schedule and without difficulty.

It is estimated, and preliminary operating figures indicate, that the installation of the new units will result in a saving over previous hand fired methods of approximately $25,000 per year, which will permit the return of the investment involved over a period of 3 or 4 years.

The general arrangement of the steam generating units is shown on the accompanying drawings and photographs.

Principal Equipment

Boiler—6,000 sq. ft. ring flow bent tube type	Riley Stoker Corp.
Economizer—1,600 sq. ft. header type	Riley Stoker Corp.
Stoker—10' x 16'-11"—Harrington type	Riley Stoker Corp.
Combustion control equipment	A. W. Cash Co.
Settings	Riley Stoker Corp.
Forced and induced draft fans	B. F. Sturtevant Co.
Motors	General Electric Co.
Blowers	Diamond Power Specialty Co.
Water column	Diamond Power Specialty Co.
Steam gage and safety valves	Consolidated-Ashcroft-Hancock Corp.
Blow-off valves	Yarnall-Waring Corp.
Feed water and miscellaneous valves	Edwards Mfg. Co.
Feed water regulator	Northern Equipment Co.

The new units were placed in service during September, 1936, and performance results at this time have fully substantiated the manufacturer's guarantees and the expectations of Mr. Buckley, the chief engineer. These results were obtained by the regular operating crew at this plant, who had had no prior experience in the operation of high efficiency steam generating equipment. The design and installation of the new steam generating units were made under the supervision of R. W. Buckley, chief engineer.

Modernizes Williamsburg Boiler Plant

Carrying along their program of boiler plant modernization, West Virginia Pulp and Paper Company is installing two high efficiency steam generating units in their Williamsburg, Pa., plant.

The new steam generating units consist of Riley boilers of 7,000 square feet, superheaters, water cooled furnace containing 2,350 square feet of water walls, and tubular air heaters containing 5,000 square feet.

Pulverized coal and oil burning equipment is being installed so that either fuel can be burned, depending upon the prevailing price differential of the fuels. Flue gas scrubbers are installed to eliminate discharge of fly ash from the stacks.

Steam will be generated at 600 pounds pressure and a steam temperature of 750 deg. F. at efficiencies of 83 per cent at the maximum load of 71,500 lbs., of steam.

The boiler furnaces will be 14 feet wide by 18 feet long. Steam prior to the installation of the new units was generated by a large number of small boilers equipped with single retort stokers.

Paperboard Men to Meet Nov. 19

The annual meeting of the members of National Paperboard Association, Inc., will be held in LePerroquet Suite (fourth floor), Waldorf-Astoria Hotel, New York, N. Y., commencing at 10:00 A. M., (Eastern Standard Time), Thursday, November 19, 1936.

This meeting is called for the election of officers for the ensuing year and for taking such other action as is specified in the by-laws of the association.

An interesting program is being arranged, which will include a report by President Sidney Frohman covering "Association Activities of the Past Year." Reports will also be made by Vice-President W. J. Alford, Jr., and by group chairmen and others.

Important subjects are to be considered, including a program of association activities for the ensuing year, and it is urged that all members attend and participate actively.

Developments by Oliver United Filters Inc.

All of the various Oliver United filters for handling pulp have been re-designed recently to provide greater drainage area, thus assuring freer flow and higher capacities. Parts and accessories have been standardized for each type. One of the important refinements has been the application of hydraulic operated automatic float controls to all types of filters. Chemically resisting materials are used wherever needed, such as cast bronze, stainless steel, nickel-steel, rubber and tile.

The Double Discharge Roll is being used on filters handling stock such as produced in the southern kraft mills. This method of discharging is proving very effective on these stocks. The use of the Oliver Vacuum Discharger is continued on those filters handling thin sheets of chemical stock.

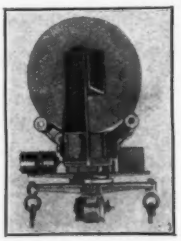
The latest type kraft washers are constructed entirely of cast-iron and other resisting metal or kraft resisting alloys. Efficiency in washing stocks has never before been as high as it is today and the Oliver-Young filter is responsible. This filter owes its efficiency and high capacity to the unrestricted flow of filtrate from cover to barometric leg or pump line. Friction losses are practically eliminated. The filter will handle any volume the stock itself will pass. High washing efficiency results from the uniform texture of the cake formed over the entire surface of the drum, aided by the unrestricted flow of wash water.

The Oliver two-stage kraft washing system has recently been introduced into southern kraft mills. This system provided higher gravity liquors for the evaporator and lower total salt cake loss than has been possible with any other method, including diffusers.

The 4 inch Olivite Acid Pump was placed on the market this past year. It complements the 1¼ and 2 inch Olivite Pumps and handles effectively and with exceptionally low maintenance most of the acids and chemicals used in paper mills, hot as well as cold.

A New Mansaver Grab Development

The illustration presented herewith represents another Mansaver grab development for improving operations in paper mills, corrugated box plants, etc., supplied by J-B Engineering Sales Company, New Haven, Conn.

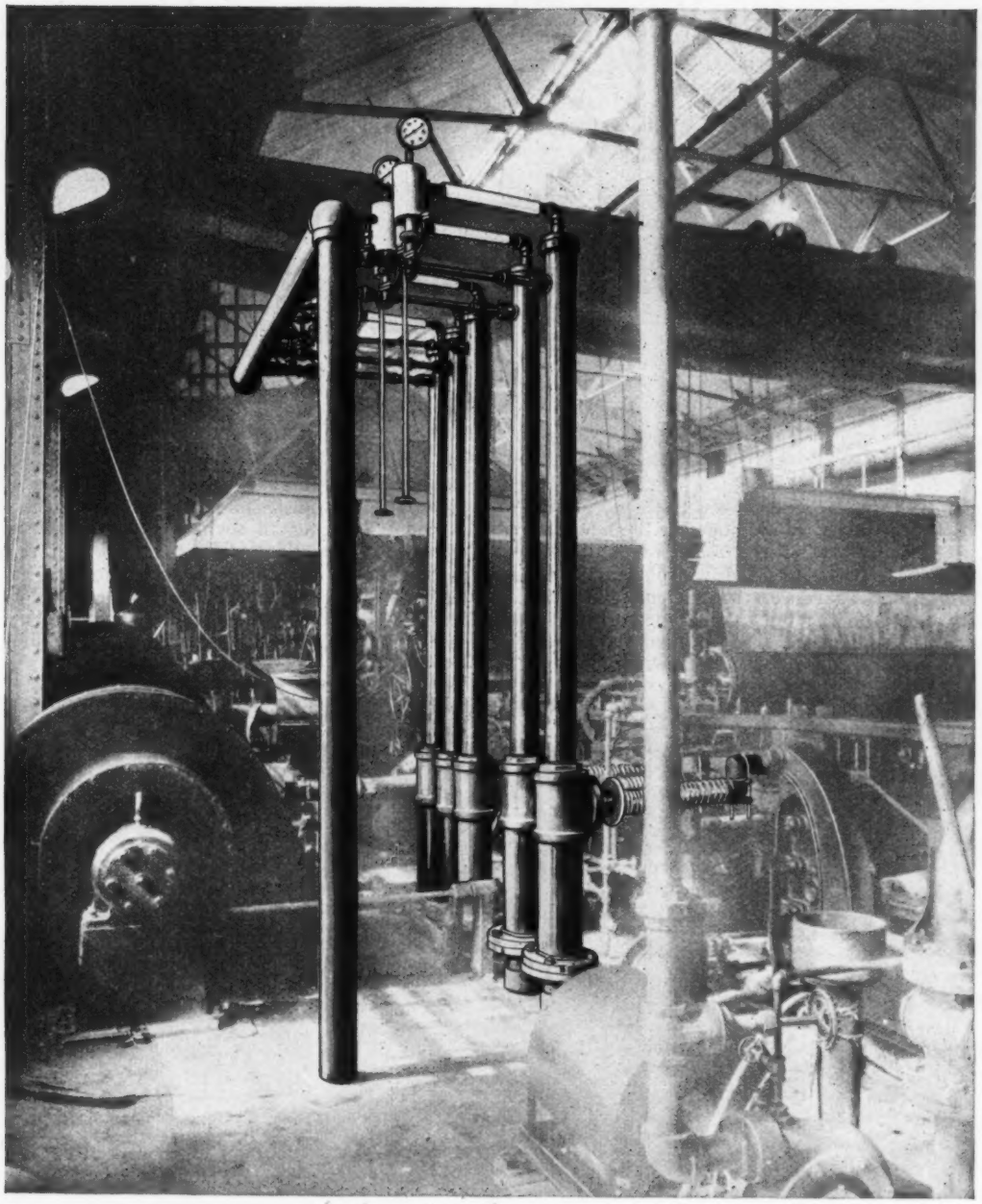


This device consists of the original Mansaver roll grab which has been in service quite some years and which is entirely operated from the crane without the assistance of a floor man.

The latest development is the addition of a motor driven turn table from which the grapple proper is suspended. With this grapple the crane operator can lift a roll of paper and turn it 90 deg. without any floor assistance whatever. Its use is particularly advantageous where the same crane serves the storage space and the combiners and where the combiners are at right angles to the line of storage. By means of the motor driven turn table it is possible for the crane operator to do all the work without waiting for the floor man to turn the roll.

Mansaver grabs are built to very high standards of manufacture and are not merely a one-time assembly of parts. They are built as carefully as any paper machine with highest quality materials and are designed rather to operating efficiently as a machine than merely as a means of picking up paper. Mansaver grabs are built for handling other products around paper mills.

BROUGHTON SYSTEM OF UNIT VACUUM CONTROL



Reproduced with the permission of West Virginia Pulp & Paper Company, Mechanicville, New York. One of the 19 successful installations in the various mills of this company.

AN INDEPENDENT POSITIVE CONTROL OF THE VACUUM ON EACH FLAT BOX ELIMINATING THE FLAT BOX VACUUM PUMP AND ALLOWING MORE WATER TO BE WORKED INTO THE SHEET

A. E. BROUGHTON AND COMPANY

Glens Falls, New York

New Weyerhaeuser Unbleached Sulphite Mill at Everett, Wash. Is Model of Efficiency

Built by the Pulp Division, Weyerhaeuser Timber Company, the new unbleached sulphite pulp mill, now in operation at Everett, Wash., represents the latest step in utilization of the vast timber resources of the Pacific Northwest.

The Everett mill is the second to be erected by the Pulp Division of Weyerhaeuser. The first mill, operating at Longview, Wash., started production five years ago and has consistently manufactured a high grade of bleached sulphite.

Both mills are supplied with logs harvested in the course of regular Weyerhaeuser logging operations. At Longview and Everett, Wash., the Timber Company has extensive saw mills which require a steady supply of raw material. West Coast hemlock, a highly desirable pulpwood, is found in abundance within the company's own timber stands. Directing this wood into pulp manufacture is a sound economic move, making for more efficient use of natural resources.

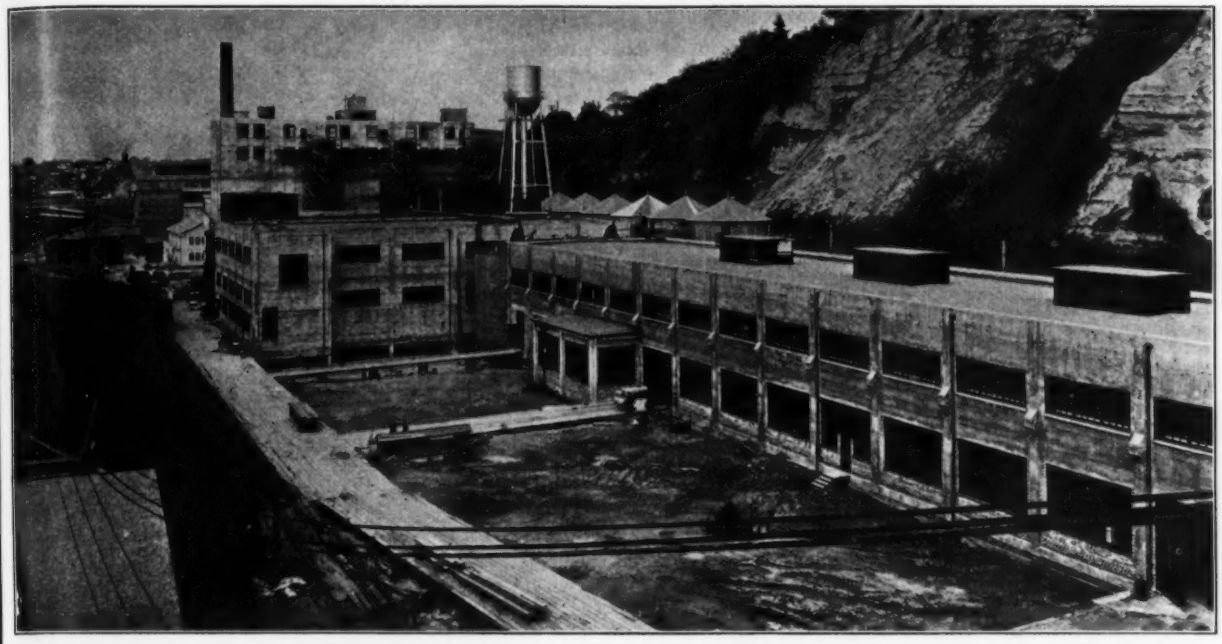
In South Bay on Puget Sound, logs for the new Everett pulp mill are made into rafts which are towed directly to the log pond beside the break-down plant. The new unbleached mill is designed for the efficient production of high quality domestic sulphite. Every effort has been made to insure cleanliness and uniformity of the product. A flow story of pulp production at the Weyerhaeuser unbleached sulphite mill follows:

The Break-down Plant

This plant is, in effect, a specialized saw mill. Its function: to reduce the logs into cants or planks so that the cleaning up processes of the chipping plant can be carried forward.

At the new Weyerhaeuser unbleached sulphite mill special emphasis has been placed upon the cleaning of its pulpwood, preparatory to the making of chips. Such emphasis naturally has its effect in the break-down plant where thick logs must be sliced up in such a way that a thorough inspection of all the contained wood is made possible. Experiments carried out by Pulp Division men at the Longview mill indicated that these log slices should have a thickness of four inches. The practice of sawing all logs into planks four inches thick is a precaution which gives full assurance that all natural defects will be revealed. Bringing all such defects to light is, of course, essential before the careful removal of dirt sources can become highly effective. Directed toward attaining high quality in the final product, the break-down plant at Everett is geared to the production of cants which facilitate rather than hamper the cleaning operations.

NEW MILL OF WEYERHAEUSER TIMBER CO., EVERETT, WASH., WHICH WENT INTO OPERATION DURING THE SUMMER



NEW WEYERHAEUSER MILL WILL MAKE 150 TONS OF UNBLEACHED SULPHITE DAILY

Logs entering the break-down plant are hoisted from the log pond beside the mill by means of a haul up. Near the top of this inclined plane is the head rig, the high-speed sawing mechanism which cuts the log into lengthwise slices. Passing along on a chain conveyor, these pieces are cut not to exceed sixteen inches in width or twelve feet in length.

Smaller sized slabs, having only one sawn surface and considerable bark, are handled within the break-down plant. Passing through a bolter, these slabs are cut to lengths convenient for removal of the bark in the "Gruber" slab barkers. Slabs then pass to the inspection and cleaning tables before going to the fifty-one inch Sumner chipper which reduces the cleaned slabs to chips.

The large cants, comprising by far the bulk of the wood for chip-making, are carried by a chain conveyor to the chipping plant.

The Chipping Plant

Arriving at the wood cleaning plant, the cants are distributed automatically to four reserve or storage tables, each of which is drawn upon by a Stetson-Ross power barker. The barking machines installed at Everett are known as "43's." They were selected because of their exceptional flexibility, being adapted to thorough removal of bark from sections of various sized logs. The concave cutter head is so arranged that rapid adjustment on the part of the operator sets the knives for any curvature within a generous range. This feature makes for effective barking with a minimum amount of waste.

Each "43" is so designed as to be under the control of a single operator. Push buttons built into levers enable the workman to move the cant forward or backward and to adjust the position of the three-knife concave cutter head.

As a result of the flexibility of the power barkers, it is unnecessary to take an unduly heavy cut on the original passing through of stock. Instead, a light cut, taken at the risk of missing some bark, is frequently the economical procedure. For a second cut is quickly made. This practice conserves desirable pulpwood.

Cants are delivered to the power barkers by a system of chain conveyors. One at a time, these cants drop into the feeding position, after which they are held rigidly in place by pressure rolls that force the stock against feed rolls set at right angles to each other.

Thoroughly barked cants are sent automatically to a table from which they are fed to the wood cleaning machines. There are twenty-four of these "knott borers," six to each power barker. Individually operated, each machine consists of the following units:

(a) a "boring" device for removing knots. (This consists of a drill supported by an arm that can be raised or lowered hydraulically. The drill is operated directly by a five horse power Westinghouse motor, running at 3600 revolutions per minute.)

(b) a "routing" arrangement. (Drills are so designed as to permit their use for routing, removing seams or streaks of undesirable wood.)

(c) a "table." (On this cants are supported and moved automatically forward or backward as directed by the operator.)

(d) a "turn over" device. (Cants are flipped automatically and swing over below the surface of the table, thereby keeping out of the way.)

(e) a "dogging" device. (This consists of mechanical arms which clamp down to hold the cant rigid during operations of boring and routing.)

Under the knot boring machines as well as the power barkers is a conveyor for carrying the refuse. This material makes up a portion of the hog fuel burned in dutch ovens at the boiler house.

Cleaned cants, those which have been stripped of bark and then scoured of all defects by the knot borers, pass by chain conveyor to either of the boring machines. Mistakes can be traced, since the dogging arrangement on each borer imprints an identifying number on the surface of every cant. Should any defect appear to an inspector, he directs the cant in which it occurs to a cleaning table where the plank gets another going over.

In addition to examining cleaned pieces of wood, these inspectors place accepted cants on an inclined conveyor

which moves toward the chippers. Prior to reaching these, the cants pass through a shower spray where encased spray nozzles direct streams of water at the four sides of every piece of wood to be chipped. This practice insures the removal of residual sawdust and particles of undesired wood substance.

Three 72 inch Sumner chippers reduce cants to chips of uniform size. Each chipper is placed at the bottom of a steel chute down which cleaned cants are dropped. Each chipper is powered with a Westinghouse motor of 150 horse power and operates at a speed of 514 revolutions per minute. The heavy knives which produce chips are fastened at regular intervals to a steel disc. Knives are detachable and are sharpened regularly.

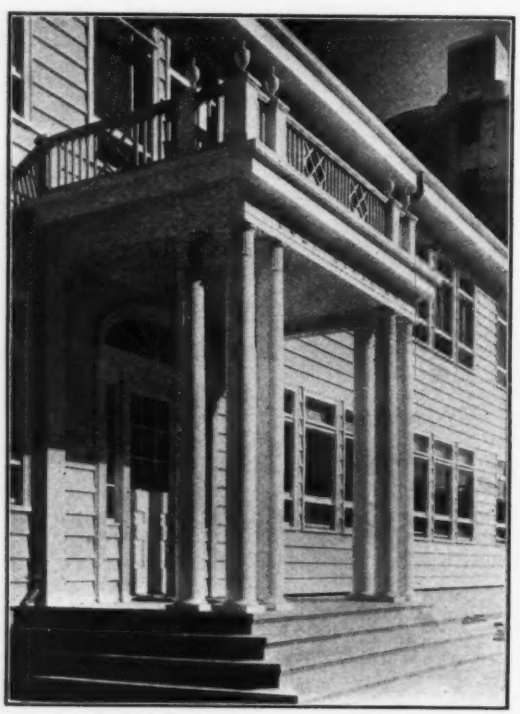
Each of the chippers has a bottom discharge, emptying onto a two section chain conveyor which carries chipped wood to hoppers situated above each of the four Sumner "shaker type" screens. Out of these hoppers, chips are drawn at a definite rate.

As the screen oscillates back and forth, chips slide down the inclined surface, accepted pieces dropping through the two inch holes. Those chips that reach the bottom of the incline without dropping through the mesh are carried by conveyor to a crusher where they are broken down and once again sent over the screens.

Accepted chips drop to a belt conveyor which, in moving toward the chip storage building, passes over a Merrick weightometer. This instrument automatically records and totals the weight of chips going from the wood preparation plant to the chip storage building.

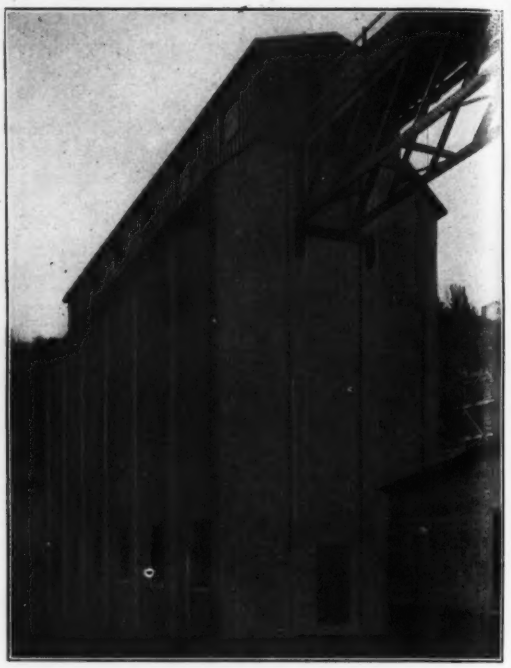
The Chip Storage Building

This building, of wood construction, is 148 feet long and 82 feet wide. Inside its gabled roof, 69 feet high, runs an automatic tripper device which distributes incoming chips, dropping them uniformly into each of three large bins. This self-propelling tripper is of the Link-Belt type.



OFFICE ENTRANCE

Attractive entrance to the efficient office building at the Weyerhaeuser unbleached sulphite pulp mill in Everett, Wash. On the ground floor of this building there is a fully equipped laboratory.



CONCRETE SULPHUR STORAGE BUILDING

At the bottom of each bin are four hoppers which measure twelve feet in width, thirteen feet in depth, and extend the full width of the building. One side of every hopper is inclined sharply to facilitate gravity flow of the contained chips.

Twelve lines of rotary feeders, one mounted at the bottom of each hopper, run crosswise in the chip storage building. Parallel to each is a belt cross conveyor (24 inches wide) carrying chips to another belt (42 inches wide) that maintains flow to the main-line conveyor.

Chips at the new Everett mill are handled in the same manner as those at the Weyerhaeuser bleached sulphite unit which has been operating at Longview, Wash., since 1931. Both mills make use of an exceptionally efficient conveyor hook-up which permits rapid transfer of chips from storage to digester. Chip storage, in both cases, is maintained in a structure separate from the digester house. This arrangement was introduced on the West Coast by O. C. Schoenwerk, designer of both Weyerhaeuser mills. Its advantages are several. Where it was formerly necessary to construct an extra heavy digester building to support chips above the operating floor, this practice, by removing the load, makes for economy of erection. Also, it permits a greater reserve of chips to be held in storage, thereby freeing the cooking operations from a binding dependence upon the chipping plant.

Another advantage is that chips of uniform moisture content are assured by permitting the withdrawal of a cross section of chips in storage.

All conveyor belts, including the 445 foot main line carrier, are under the control of the cook on duty atop the digester house. For each digester charge, through an arrangement of push buttons, he can draw chips successively from any storage bin. Chips are carried up the inclined main line belt, then are run along the top floor of the di-

gester house. Here there is a movable tripper which is placed directly above the digester being charged. Incoming chips are guided through a chute to fall into the digester below. The time required for filling a single digester with chips is fifteen minutes.

Chips carried from storage pass over another Merrick weightometer. Its recordings give the operator an accurate check on the weight of chips going into each of the six digesters.

The Filter Plant

Unique among filter plants is the water purification unit of the new Weyerhaeuser unbleached mill at Everett. The plant is situated high above the mill's operating floor and is about a mile distant from the mill site. It is constructed entirely of wood, Douglas fir having been used extensively. In ground area the plant covers more than three acres. Present capacity of the purification plant is 16 million gallons daily; the present demand is for about 12 million gallons. Future expansion has been made possible.

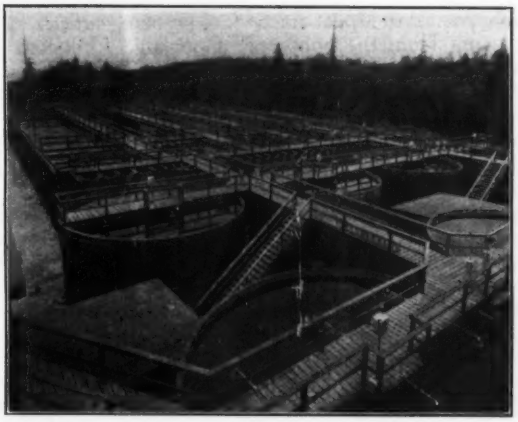
Original source of water for the Everett mill is a mountain stream, the Sultan river. The city of Everett water department supplies raw water to the filter plant, furnishing it by way of a reservoir placed at a level one hundred feet above the filter plant intake. This head on the incoming water is utilized to advantage throughout the water purification plant.

A 24-inch supply line carries the raw water to the filter plant. This water is of exceptional quality and can be effectively purified at low treatment costs. Incoming water passes through a venturi tube at which point both city and mill venturi meters are actuated, measuring the flow.

Placed directly within the head house is a by-pass take-off which uses the 100 foot head to drive a turbine that pumps finished water from the clear well to the wash water tank. The valve on this by-pass is automatically operated by a level controller on the wash water tank. By-

CHIP STORAGE BUILDING

Within this wooden structure chips are kept until needed for cooking. They are drawn from storage and sent to the digesters by means of a system of conveyors controlled by an operator in the digester house. The time for filling a digester is fifteen minutes.



THE FILTER PLANT

Built of wood, the unique water purification plant at Everett, is situated a mile from the mill site—240 feet above the operating floor. Showing in the foreground are the filters. There are eight of these, each with a capacity of two million gallons of water daily. Behind them in the picture, are five settling tanks, beyond which the filter plant head house is visible.

passed water rejoins the main supply line which then divides into three smaller pipes. These converge into what is known as an "up-comer", a large pipe which runs to the upper part of the head house. Lime, ammonia and chlorine are added at the bottom of the up-comer. This point of application was selected so as to obtain maximum diffusion before the other coagulating agent, alum, is added. Corresponding with the up-comer is a down-comer, each named after the flow of water. Between the two, at the top, is an open flume into which alum is discharged. The amount of chemicals added is regulated by the rate of flow of incoming raw water.

Water then passes into agitating chambers so designed that the head does away with the need for an agitating mechanism.

Passing from the mixing tanks, water goes to a header drawn upon by five settling tanks. Each of these is a half cylinder 26 feet in diameter and 200 feet in length. The water depth is 14 feet.

There are eight filters, circular in shape. Every one of them is 32 feet in diameter by 13 feet deep. Each has a capacity of two million gallons every twenty-four hours.

Purified water flows to the clear well, a covered wooden tank of 700,000 gallon capacity. This tank is round, having a diameter of 70 feet and a depth of 22 feet. Within it, the level of water automatically governs the rate of flow in the beds.

Purified water is used for back washing the filter beds. It is raised 70 feet to the wash water tank from which it is drawn as needed.

The clear well is connected by a pipe line 6000 feet long with a constant head tank at the mill. The filter plant is 240 feet above the level of the mill floor.

A single operator runs the remote water purification plant. He is assisted by a battery of indicating instruments. The recording instruments are located in the laboratory at the pulp mill proper.

The Making of Acid

Placed conveniently beside the deep waters of Puget Sound, the new pulp mill receives its supply of sulphur directly from ocean-going vessels that transport it from Texas. These ships, while tied up at the pulp mill dock, are emptied of sulphur by means of a clam shell bucket which discharges into a movable hopper, placed on the

dock opposite the particular "hold" being drawn upon.

Drawing from the hopper is a portable Link-Belt sectional conveyor, which, in turn, feeds sulphur to an elevated belt conveyor, eighteen inches wide and 726 feet long. This fixed carrier hauls sulphur directly to the top of the sulphur storage building, a concrete structure fitted with six bins, having a total capacity of 1500 tons.

Feeders placed at the bottom of these bins draw off sulphur as called for by an automatic float which moves up and down with the level of melted sulphur in the melting pit. The feeders, when set in motion, empty onto an eighteen inch belt which discharges into a twelve inch diameter screw conveyor, set at an incline and connected directly with the melting pit. A weightometer records the weight of sulphur drawn from storage.

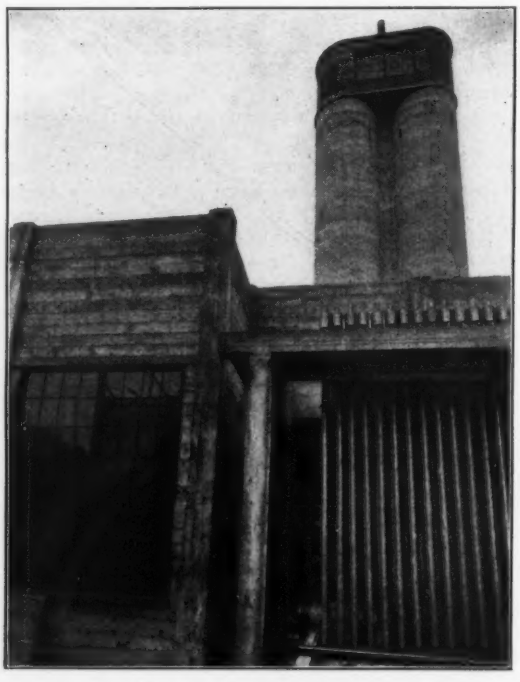
The melter consists of a pit three feet deep, eight feet wide and thirty-five feet long. Below the level of the contained liquid sulphur are four rows of steam coils, used to maintain the correct temperature.

Placed alongside the melting pit is the spray burner, a horizontal steel cylinder eight feet in diameter and twenty-nine feet long. The shell is lined with one inch of asbestos inside the steel; then follows eight inches of fire-brick and four inches of sil-o-cell.

This type of burner, new to the pulp industry, has been used effectively in the commercial production of sulphuric acid. It has distinct advantages over the open style of burner.

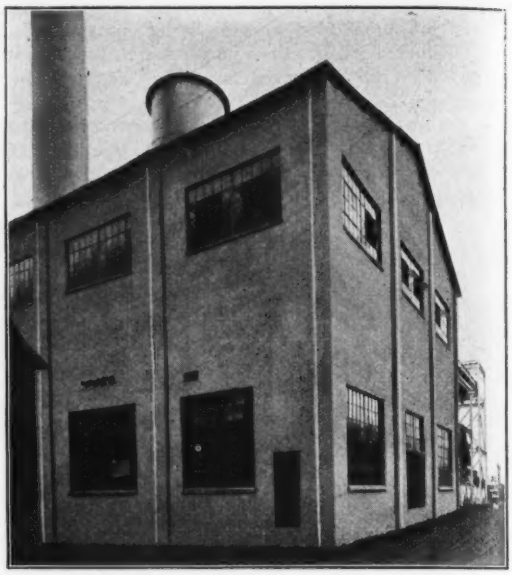
Melted sulphur is pumped from the pit by means of two specially designed pumps, the liquid being injected into the burner through two jets placed near the center of one end of the cylinder. Also at this point air is introduced by a blower which handles only air, thus doing away with the necessity of its being constructed of gas resisting materials.

The sulphur burns as it flows into the spray burner. The produced gas passes on through pipes which are cooled on the outside by water. Continuing, this gas goes to the Jenssen towers.



PART OF THE ACID PLANT

Gas, after leaving the spray burner, is cooled in the pipes which show on the right. Rising in the background are the Jenssen towers.



THE POWER PLANT

Mill pressure carries water to the top of the weak Jenssen tower, no pump being necessary. But the weak acid is pumped to the top of the strong tower.

The produced acid goes to a settling tank, sixteen feet in diameter and twelve feet high. Pumped through a pressure tower, the acid goes to the filters, each of them twelve feet in diameter and nine feet high. Thirty inches of sand constitutes the filter medium. The clear well, into which the finished acid flows, is a round tank six feet in diameter and eleven feet high. From the clear well acid goes to storage in four large wooden tanks, connected with one of two spherical acid accumulators. Each of the accumulators, constructed of 1⅛ inch steel plate, has an inside diameter of thirty feet and a volume of 12,000 feet.

All piping in the acid plant is of lead, furnished by the Northwest Lead Company of Seattle. Most of the pipe and sheet lead contains six per cent antimony.

The Boiler House

The boiler house, which supplies process steam and power to the mill, is equipped with two 4-drum Stirling type Babcock and Wilcox boilers, designed to operate at a pressure of 600 pounds per square inch. Steam is produced at this pressure and at 150 degs. F. superheat. Both boilers are provided with dutch ovens for burning hog fuel and have, as an auxiliary, four oil jets per boiler.

Approximately one-third of the feed water is supplied by condensate from the drying machine and sawmill, the remaining two-thirds being drawn as fresh water from the filter plant. Two Worthington six stage centrifugal pumps handle feed water. One of the pumps is driven electrically; the other operates on a steam turbine.

Electric power is produced by two Westinghouse turbine-driven generators. In the boiler house is the 2500 KW generator, which takes the entire output of the boilers. A smaller generator, 1000 KW, is situated in the machine room and operates on the entire machine steam.

Careful instrumentation is maintained within the boiler house. In addition, daily chemical tests are made in the

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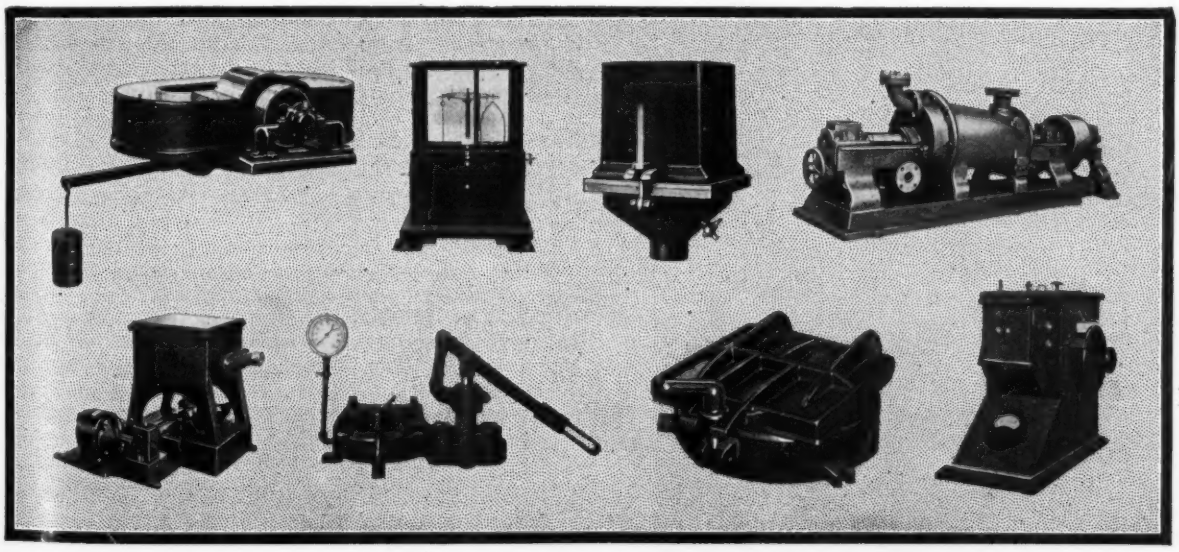


This illustration shows pictures of the Beater, Drying Oven, Sheet Mould, Jordan, Flat Screen, Hydraulic Press, Hot Plate and Size Tester. Other items include Washer Cylinders, Couch Rolls, Fractionating Screens, Clay Erosion Tester and Bleachability Tester.

laboratory to determine the proper treatment of feed water.

The Digester House

The new Weyerhaeuser unbleached mill at Everett carries on cooking operations in six digesters, all of them constructed of 1¾ inch steel plate. Each digester is fifty-two feet high and has a diameter of seventeen and one-half feet. The volumetric capacity of each is 7,176 cubic feet. The digesters have a pulp capacity of sixteen tons each. They were built by the Willamette Iron and Steel Corporation of Portland, Ore., who also made the spherical accumulators. The digesters are designed for a working pressure of 150 pounds per square inch.

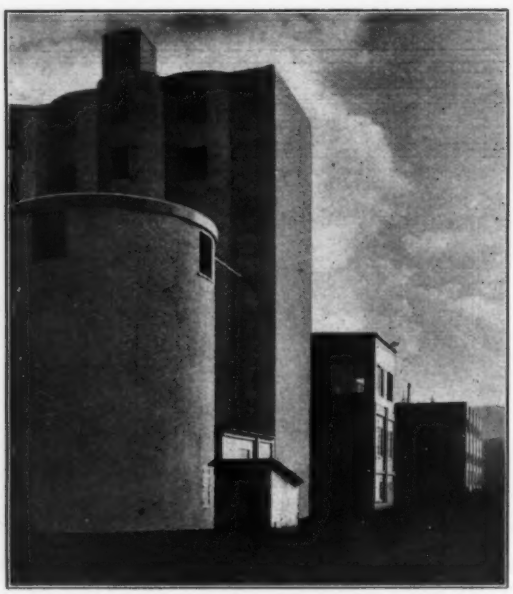
The control instruments on each digester consists of: a Foxboro pressure recorder; a Foxboro steam flow meter; a Foxboro liquid level gauge; and a Leeds & Northrup Micromax temperature recorder. Such intensive instrumentation is an important factor in the production of uniform high quality unbleached sulphite.

Fifteen minutes are required for the filling of a digester with chips. Incoming chips are sampled and dried in an oven situated on the top floor of the digester house. In this way the moisture content is determined.

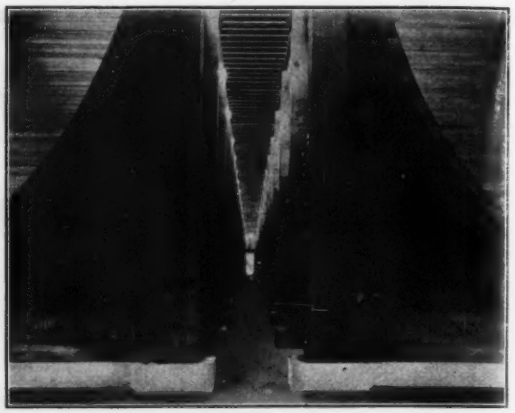
Raw acid is pumped from storage to the low pressure eductor. After mixing with the blow down gas, enriched acid passes to the low pressure accumulator in which pressure is maintained at fifteen pounds per square inch. Acid then goes via the high pressure eductor to the high pressure accumulator, held under a pressure of fifty pounds per square inch.

Two 4-inch and one 8-inch venturi meters, made by the Builders Iron Foundry, are installed in this system, the large one measuring the flow of acid from the high pressure accumulator to the digesters. Bingham pumps are used throughout the system.

After the cooking cycle has been completed, the blow-down of a digester is terminated by opening the blow valve. Each of the six valves is operated by a ½ horse power electric motor, installed to give better control of the blowing operation.



THE ACCUMULATOR HOUSING, DIGESTER HOUSE, KNOTTERS AND SCREEN ROOM



VIEW BETWEEN TWO OF THE FIVE SETTLING TANKS
This picture shows how the extensive use of wood contributes in making this plant unique among water purification systems. Filter beds, as well, are constructed of Douglas fir. Having a capacity of 16,000,000 gallons a day, this plant supplies purified water at the rate of 12,000,000 gallons every twenty-four hours.

At the end of the cook, the digester charge is released under pressure, going directly into the blow pit.

The Blow Pits

There are three of these, all of wood stave construction. Each is forty feet in diameter and twenty-eight feet in height. Stainless steel bottoms and targets are installed.

Placed alongside the blow pits are three condenser towers which replace the usual "vomit" stacks. Each tower is twelve feet in diameter and eighty-two feet in height. Tops are water sealed. Chemical stoneware absorbing fillings are used within each tower.

Blow pit gas enters the towers and is cooled by a water spray. Cooled gas, 80 to 90 per cent sulphur dioxide, is piped to the gas absorption towers, situated at the acid plant beside the weak and strong Jenssen towers. Absorption tower number one is filled with absorbing tile; the other is filled with limerock. Water flows count currently to the gas, producing acid of "high free" content. Acid made with recovered gas is piped to the acid tanks.

Five minutes after the start of the blow, the pit drain valve is opened. At the end of the blow, the pit cover is removed and stock is leveled with a monitor. The blow pit is then filled with water and stock is washed for two hours, after which it goes to the blow pit sump. By gravity it flows to the knotters.

The Knotters

These are of the flat screen type. There are three rows, each of them with fourteen screen plates of .04 cut. Knotted stock drops to a sump from which it is elevated by means of two Bingham pumps to the top floor of the knotter building, where washing and thickening occurs. The Improved Paper Machinery Corporation furnished the washer, a cylinder eight feet in diameter and sixteen feet in length. Stock then goes to the blending tanks.

The Blending Tanks

Distribution of the stock to the six blending tanks, each of them thirty feet in diameter by thirty feet in height, is handled by a six-way valve. This valve is motor-driven and can be set to distribute stock in any desired way—segregating one cook, evenly mixing the pulp, by-passing certain tanks, etc. This gives complete flexibility to the new pulp mill so far as the carrying through of special

Chemipulp Accumulator housing shown next to Digester building.

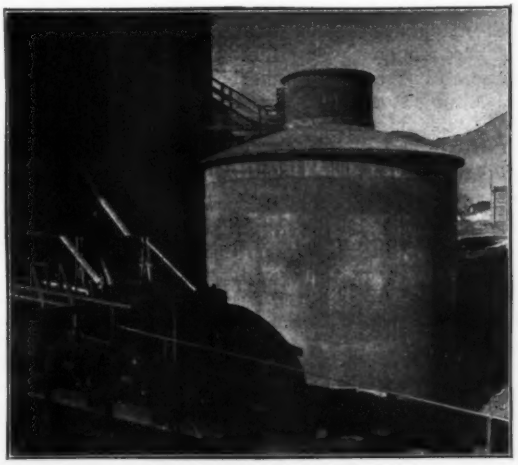
THE IMPROVED CHEMIPULP PROCESS

The Chemipulp installation at the new Weyerhaeuser 150 tons per day unbleached pulp mill at Everett, Washington, is the 41st Chemipulp System to start into operation.

The CHEMIPULP installation at the plant of the British Columbia Pulp & Paper Co. at Port Alice, B. C. is the 39th Chemipulp System to start into operation while the British Columbia Pulp & Paper Co. installation at Woodfiber, B. C. is the 40th Chemipulp System to start into operation.

Of these 41 CHEMIPULP SYSTEMS 8 represent REPEAT ORDERS.

From a business standpoint these 41 installations speak forcefully of the economies inherent in the CHEMIPULP PROCESS.



CHEMIPULP PROCESS, INC.

Woolworth Building
Watertown, N. Y.

Pacific Coast Office: 3311 First Ave., So.
Seattle, Washington

and in Canada
Chemipulp Process, Ltd., 403 Crescent Bldg., Montreal, P. Q.

cooks is concerned. Stock from the blending tanks goes, by way of a dilution head box, to the rifflers.

The Rifflers

Controlling the consistency of stock to be riffled is a photo-electric cell, an arrangement similar to that used at the Weyerhaeuser Longview mill. Rifflers and screens are housed in a concrete building, 144 feet long by 100 feet wide. Situated on the top floor are twelve rows of rifflers, each of them eleven feet wide and seventy feet long. Riffled stock drops by gravity to the screens.

The Screens

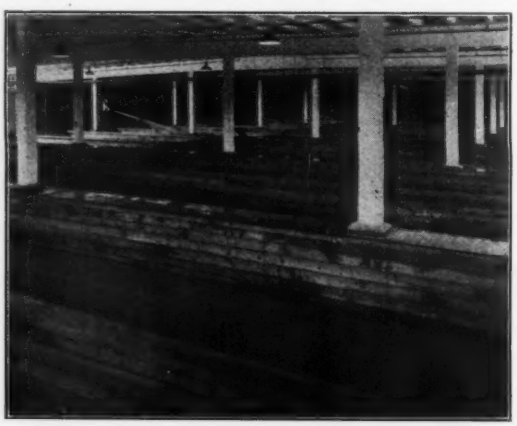
There are three sections of screens having five, three, and two rows respectively. The rejects of section one go to section two; rejects of section two go to section three. Final tailings, together with material rejected by the knotters, are thickened, pressed and used for fuel in the boiler house. The thickening of tailings is accomplished by an IMPCO (Improved Paper Machinery Corporation) drum type thickener, having a drum five feet in diameter and ten feet long.

Screened stock, after it is de-watered, falls to a belt conveyor (Link-Belt Company) and goes by way of a sump to the screened stock storage tanks. Its consistency is controlled automatically. Stock from these tanks flows to the machine chest, then to the machine room.

The Machine Room

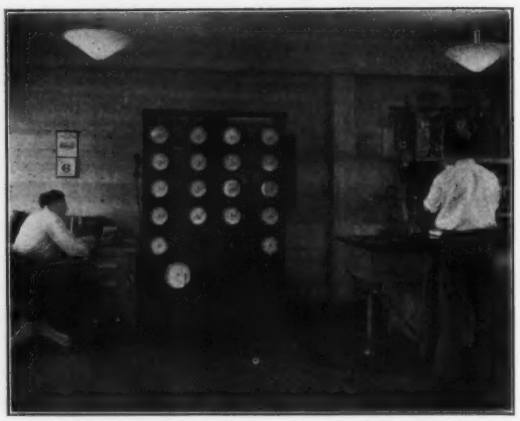
The building in which the pulp-drying machine is placed is sixty feet wide and three hundred and sixty feet long. The Minton Vacuum drier used here was constructed by Rice, Barton & Fales of Worcester, Mass. A Minton Vacuum drier has been in use at the Weyerhaeuser Longview mill for five years, during which time an intensive record of its performance has been maintained. On the basis of its efficient performance, a similar installation was decided upon for the new unbleached mill at Everett. Both machines have a width of 156 inches, but a few specific changes are apparent on the new drier. The drying machine at Everett weighs about two million pounds.

Incoming stock flows through the head box and then out on the wire, ninety-five feet long, which rides on fifty-four rubber-covered table rolls. Placed under these are Monel metal saveall trays. An unusual feature of the wire is that one end may be raised or lowered as much as six inches, making possible its adjustment at whatever inclination proves most efficient. Glazed white tile lines the wire pit.



THE RIFFLER ROOM

The Weyerhaeuser unbleached sulphite mill has twelve rows of rifflers. The riffler room is directly above the screen room. Riffled stock is taken by gravity to the screens.



FILTER PLANT RECORDING INSTRUMENTS

The filter plant recording instruments shown here are mounted in the laboratory of the new pulp mill at Everett, Wash. These instruments maintain an accurate record of filter plant operations, carried on a mile away.

On leaving the table rolls, the wire passes over six suction boxes, operated by the Broughton Unit Vacuum Control System. This system allows individual regulation of suction boxes and can be adjusted for any desired pull. Riding on the suction couch is a heavy rubber-covered roll.

The sheet of pulp, when it leaves the wire, passes through three press rolls. These are designed to remove as much water as possible before the pulp is sent into the vacuum chamber.

An arrangement of two chromium plated rolls and one rubber-covered roll constitutes the ingoing seal through which pulp passes into the vacuum chamber. As high as twenty-eight inches of vacuum can be maintained within this sealed compartment.

Inside are forty-four drier rolls, all mounted on anti-friction bearings placed in housings on the outside of the machine.

Emerging through an out-going seal, the dried sheet of pulp passes to the cutter, built by the Beloit Iron Works of Beloit, Wis. A new arrangement here permits sheets of pulp to fall directly into piles that later become bales, thus eliminating the strenuous labor that ordinarily goes with work at the cutter boxes.

Pulp piles are compressed hydraulically prior to being bound into bales which then are carried by conveyor to the pulp storage building.

The Pulp Storage Building

The wooden structure used for storing pulp prior to shipment is strategically placed between railroad tracks and the waters of Puget Sound. As a result, for land transportation, bales have to be moved by a few feet to the cleaned box cars in which they are stacked, flaps down, and the tiers braced against shifting. Another door of the building leads directly to the shipping dock where ocean-going vessels are carefully loaded with pulp destined for the Atlantic seaboard.

FIRMS WHO SUPPLIED EQUIPMENT AND SERVICE

The following is a list of companies supplying equipment and services in connection with the construction of the Everett mill.

Excavation

Preparatory toward putting up any buildings on the plant site, excavation and removal of all debris, slab, and foreign material was completed by the Acme Construc-

tion Company, Seattle, Wash. Material was removed down to the beach level.

Piling

All concrete and wooden buildings are resting on fir and cedar pilings. Western Pole and Piling Company, Everett, Wash., furnished the pilings. American Pile Driving Company, Everett, Wash., drove the pilings.

Building Construction

All concrete buildings were erected by Alloway & Georg, Spokane, Wash. These concrete buildings are as follows: Boiler Room, Sulphur Storage, Acid Plant, Acid Towers, Accumulator, Digester, Knotter, Screen Room, and Machine Room. Slip form construction was used wherever possible. Superior Portland Cement, Inc., Seattle, Wash., furnished the cement.

The wooden buildings: The Chip Plant, Chip Storage, and Pulp Storage were constructed by H. J. Solie, Everett, Wash.

The office building was erected by Ole K. Sather, Everett, Wash.

Equipment—Power House

Boilers (2) were purchased from Babcock & Wilcox, Seattle, Wash. They are of the Stirling Water Tube type. Babcock & Wilcox also furnished two return bend superheaters, two water walls, two tubular air preheaters, and eight mechanical oil burners.

Diamond Power Specialty Corporation, Detroit, Mich., furnished two soot blowers.

Cochrane Corporation, Philadelphia, Pa., supplied one deareating heater.

Green Fuel Economizer Company, Beacon, N. Y., furnished two forced draft fans and two induced draft fans.

Northern Equipment Company, Erie, Pa., supplied two Copes feedwater regulators.

Worthington Pump and Machinery Corporation, Harrison, N. J., supplied two boiler feed pumps.

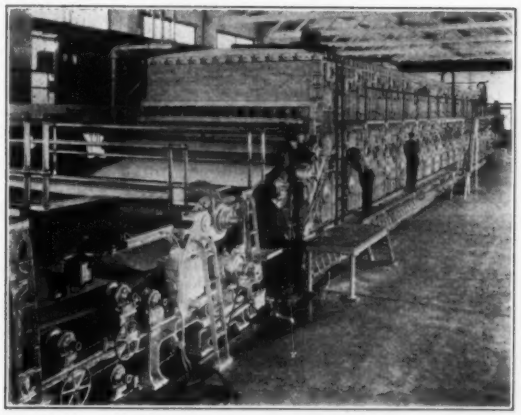
C. C. Moore Company, San Francisco, Cal., furnished all boiler room piping and installed all of the above machinery and equipment.

Link-Belt Company, Seattle, Wash., furnished all fuel conveyors and James H. Brinkley, Seattle, Wash., completed installation.

Isaacson Iron Works, Seattle, Wash., supplied boiler house gratings and walkways.

WOOD CLEANING MACHINES

After passing through power barkers, cants at the new Everett mill go to knot borers, shown above, where wood is thoroughly cleaned before being chipped. There are twenty-four of these knot boring machines.



THE DRYING MACHINE

The vacuum drier at the new Weyerhaeuser pulp mill has forty-four drier rolls. The wire on this machine is 156 inches wide and 95 feet long.

Colby Steel and Engineering Company, Seattle, Wash., hammer-head crane for unloading hog fuel.

Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., turbines, motors and panels.

Equipment—Chip Plant

Diamond Iron Works, Minneapolis, Minn., two roller bearing hogs.

Stetson-Ross Machine Company, Seattle, Wash., barkers.

Sumner Iron Works, Everett, Wash., chippers, knot borers, chip screens.

Henry Disston & Sons, Seattle, Wash., slasher saws.

Filter Plant

James Coyne, Port Townsend, Wash., site excavation and road building.

Shibley Company, Seattle, Wash., filter plant equipment.

Equipment—Acid Plant

Link-Belt Company supplied sulphur conveyor equipment. Jas. H. Brinkley installed this equipment.

Chemical Construction Company, New York City, furnished and installed sulphur burning plant.

Northwest Lead Company, Seattle, Wash., supplied and installed gas cooler and miscellaneous lead piping.

National Tank and Pipe Company, erected all wooden acid tanks. Stebbins Engineering and Manufacturing Company, tile lined the Jenssen lime rock towers and recovery towers.

Otis Elevator Company, installed the elevator in acid towers and digester building.

The Appleton Machine Company, Appleton, Wis., supplied one lead gas fan.

Bingham Pump Company, Portland, Ore., furnished pumps.

Equipment—Digesters—Accumulators

Carpenter Steel Company, Reading, Pa., Beehive coolers.

Electric Steel Foundry Company, Portland, Ore., fittings.

Michigan Steel Casting Company, Detroit, Mich., piping.

Stebbins Engineering and Manufacturing Company, Watertown, N. Y., lining digesters, accumulators, acid towers.

Willamette Iron and Steel Corporation, Portland, Ore., digester and accumulator shells.

Equipment—Blow Pits

Harrington & King Perforating Company, Chicago, Ill., blow pit bottoms.

Equipment—Screen Room

Appleton Wire Works, Inc., Appleton, Wis., furnished bronze fractionation screens.

California Press Manufacturing Company, San Francisco, Cal., continuous screw press.

Chromium Corporation of America, Waterbury, Conn., chromium plated screen plates.

W. A. Hardy & Sons Company, Fitchburg, Mass., screen plates.

Huntington Rubber Mills, Seattle, Wash., rubber rolls covering.

Improved Paper Machinery Corporation, Nashua, N. H., screens.

Equipment—Machine Room

Lindsay Wire Weaving Company, Cleveland, Ohio, supplied fourdrinier wires.

Asten-Hill Manufacturing Company, Philadelphia, Pa., furnished drier felts.

Berg Evans Chain Company, Seattle, Wash., wire tying machines.

A. E. Broughton & Co., Appleton, Wis., vacuum control unit.

Gardner-Denver Company, Quincy, Ill., compressor.

Ingersoll-Rand Company, New York City, condensor for drier, vacuum pumps.

Knox Woolen Company, Camden, Maine, drier felts.

Lockport Felt Company, Newfane, N. Y., drier felts.

Mailler-Searles, Inc., San Francisco, Cal., pulp conveyor, layboy.

Midwest Fulton Machine Company, Dayton, O., forced vapor circulating system.

Minton Vacuum Drier Corporation, Greenwich, Conn., drier license.

Pelton Water Wheel Company, San Francisco, Cal., pulp baling presses.

Rice, Barton & Fales, Worcester, Mass., drying machine.

Beloit Iron Works, Beloit, Wis., equipped drying machine with Beloit suction couch and Beloit first press rolls, also a Beloit special cutter and sheet stacker designed for this machine.

J. O. Ross Engineering Corporation, New York City, ventilating and humidifying equipment.

Equipment—Shipping

Baker-Raulang Company, Cleveland, O., furnished lift and fork trucks.

Equipment—Laboratory

Bausch & Lomb Optical Company, Rochester, N. Y., microscope.

Cambridge Instrument Company, Ossining-on-Hudson, N. Y., pyrometer.

Leeds & Northrup Company, Philadelphia, Pa., electrical instruments.

Moore Dry Kiln Company, Portland, Ore., chip drier.

B. F. Perkins Sons, Holyoke, Mass., Mullen testers.

Testing Machines, Inc., New York, N. Y., freeness tester, tensile tester (Schopper).

Tinius Olsen Testing Machines Company, Philadelphia, Pa., fold testers.

Valley Iron Works, Appleton, Wis., Laboratory beaters, sheet mold and press, flat screen.

Scientific Suppliers, Inc., laboratory supplies.

Thwing-Albert Instrument Company, Philadelphia, Pa., tear tester.

Hermann Manufacturing Company, Lancaster, O., British sheet making testing equipment.

Equipment—Miscellaneous

Bingham Pump Company, Portland, Ore., all pumps.

Barde Steel Company, Seattle, Wash., furnished nuts, bolts, steel products.

Bartlett Hayward Company, Baltimore, Md., steel products.

Phillip Carey Company, Lockland, Cincinnati, O., roofing.

Beall Pipe and Tank Corporation, Portland, Ore., steel pipe.

Crane Company, Seattle, Wash., miscellaneous piping, plumbing.

Doran Company, Seattle, Wash., bolts, fittings.

Durotile Company, Seattle, Wash., acid plant, laboratory flooring.

Garlock Packing Company, San Francisco, Cal., packing.

General Electric Company, Portland, Ore., motors, electrical goods.

Goldfinch Bros., Everett, Wash., paints.

Grinnell Company, Seattle, Wash., thermolier heaters.

G. & W. Electric Specialty Company, Chicago, Ill., electrical goods.

Hazard Insulated Wire Works, San Francisco, Cal., wire.

Alfred F. Howe, Oakland, Cal., flush shells, fittings.

Lloyd Company, Everett, Wash., hardware.

Agnew Hardware Company, Everett, Wash., hardware.

Marshall-Wells Company, Portland, Ore., hardware.

Mercon Regulator Company, Milwaukee, Wis., valves.

Merrick Scale Company, Passaic, N. J., weightometers.

Mill and Mine Supply, Inc., Seattle, Wash., conveyor belting.

National Tank and Pipe Company, Portland, Ore., all wooden tanks and pipe.

North Coast Electric Company, Seattle, Wash., electrical goods.

Northwest Bolt and Nut Company, Seattle, Wash., bolts, hardware.

Okonite Company, San Francisco, Cal., electrical goods wire, cable.

Pacific Car and Foundry Company, Seattle, Wash., hardware.

Pacific Coast Forge Company, Seattle, Wash., hardware.

Pacific Foundry Company, San Francisco, Cal., hardware.

Paraffine Companies, San Francisco, Cal., paints.

Peoria Malleable Casting Company, Peoria, Ill., pipe lugs, shoes.

Pioneer-Flintkote Company, Seattle, Wash., roofing.

Portland Galvanizing Works, Everett, Wash., galvanizing.

Seattle Boiler Works, Seattle, Wash., water tower tank.

Ray Smythe, Portland, Ore., valves.

Toledo Scale Company, Toledo, O., scales.

Walsh Construction Company, Seattle, Wash., sprinkler system.

Washington Iron Works, Seattle, Wash., valves.

Weber Chimney Company, Chicago, Ill., power plant chimney repair.

Western Gear Works, Seattle, Wash., reduction gears.

Westinghouse Electric and Manufacturing Company, San Francisco, Cal., motors, electrical supplies.

Willamette-Hyster Company, Portland, Ore., pulp carrier.

Pyrometers in the Power Plant for Indicating Flue Gas Temperature

In line with modern power plant efficiency methods, careful check is kept on the temperature of the exit flue gas from each of the six boilers, at the plant of the Weyerhaeuser Timber Company, Everett, Wash. The engineers selected the Thwing High Resistance Flue Gas Pyrometer, manufactured by Thwing-Albert Instrument Company, Philadelphia, for this important service. The pyrometer system operates on the thermo-electric principle with remote control. A thermocouple is installed in the breeching of each boiler just ahead of the damper and the wiring connections extend them to the pyrometer switch where the temperature of the exit gas from any boiler is read on the pyrometer merely by turning the dial to the proper switch contact. The pyrometer used is a Thwing Model 30 Pyrometer Unit with a six point selector switch. The indicating pyrometer and the switch are mounted together in the same cast aluminum case. The pyrometer has a temperature scale to read to a maximum of 1,000 degrees Fahrenheit. It is equipped with an outside zero adjuster, an internal automatic compensator to make corrections for any change in the ambient room temperature. A numbered dial on the instrument case makes it easy to select the proper switch point at will and read the temperature of the gases of any of the boilers. The pyrometer galvanometer has the unique Thwing offset moving coil and single air gap. This construction gives strong torque in a concentrated field, resulting in a powerful magnetic moment especially valuable in this high resistance pyrometer. The galvanometer is dead "beat" and accurate temperature readings are obtained in a few seconds. The Thwing quick acting thermocouples that are installed in the breechings of the boilers, are constructed to respond quickly to temperature variations. The special construction of the thermocouples reduces lag to a minimum so that a series of readings from all the boilers can be taken quickly. Thwing Cold End Extension Lead Wire is used to extend the thermocouples from the breechings to the pyrometer in the chief engineer's office.

Scientific control of pulp and paper quality requires the use of a variety of testing instruments. The laboratory at this mill is equipped to make various approved physical tests on pulp and paper. One of the most important of the physical tests is the tear test. The tester approved by TAPPI and used at this mill is the Elmendorf Tearing Tester manufactured by the Thwing-Albert Instrument Company, Philadelphia.

The Elmendorf Test is a dead weight test, it is done entirely by gravity, it is independent of the human element factor and this assures accurate duplication of tests regardless of who does the testing. The tests are made in machine and cross machine direction. This gives a comprehensive and composite picture of the tearing strength of the material tested. Elmendorf tearing tests are made in a few seconds. The Elmendorf Tester consists of a stationary frame with jaw attached, a movable pendulum with calibrated scale and jaw attached, and a knife blade to start the tear. The pendulum ready for testing is in an upright position which brings the two jaws in alignment. The test is made as follows: a test sample, cut to exact width in the sample cutter furnished with the instrument, is inserted in the jaws, the knife blade is cut into the sample to start the tear, then the pendulum is released by pressing down the spring stop and its fall through its arc of travel is retarded by the amount of work required to effect the tear. The amount of work done is indicated on the instrument dial. This reading is the scientific numerical value of tearing strength and is expressed in terms force grams.

Basis weight is a very important factor for consideration by both the manufacturer and consumer of papers. It is especially important for the manufacturer to control closely the weight of paper during the production processes. Marketing overweight stock has several disadvantageous features and costly aftermath.

The Thwing Basis Weight Scale is designed and constructed for both mill and laboratory use. The accuracy of this scale is maintained within very close tolerances and test weights are provided for checking the accuracy. The moving parts are mounted in jewelled bearings. Friction is reduced to a minimum. Sensitivity is increased and repetition of accurate results is consistently maintained. This basis weight scale gives dependable readings and long service with very little attention. As further aids to permanent accuracy the scale has a cast bronze truss beam and a truss pointer. The motion is "dead beat" the pointer moves across the scale to reading position without undue swinging back and forth. The scale, is equipped with a large dial, 20 inches long, set in a horizontal position so that it is very easy to read accurately and quickly the result of each weighing. The wide arc spread of the calibrated dial gives open scale divisions and this is an additional factor to obtaining accurate readings. For convenience in obtaining readings the scale has an adjustable index pointer, which is set, at will, for any required weight.

The multiple range dial permits weighing paper covering a wide range of weights. The change from one range to the other is accomplished, simply by use of the calibrated range weights, and when it is desired to change the readings from 480 to 500 basis, this is done with the small calibrated weight on the pivot shaft.

This scale has a mahogany base, with a spirit level, so that it can be mounted on a wall or other support.

Production Control

Production control through automatic weighing of raw materials in the new pulp mill of the Weyerhaeuser Timber Company, at Everett, Wash., is afforded by seven Merrick Weightometers, manufactured by the Merrick Scale Manufacturing Company, of Passaic, N. J.

Sulphur, chips and hogged fuel are weighed and reweighed, in and out of storage, with a guaranteed accuracy of 99 per cent, or even closer.

This weighing is accomplished continuously, as the materials move along the various belt conveyors, to storage or into direct use.

Variations in belt load and conveyor speed are instantly caught and recorded by each Weightometer and the weights thus obtained totalized in short tons of 2,000 pounds.

Each Weightometer has been equipped with electrical contacts suitable for the installation of distant recording instruments at any further time that the management may desire to install such information.

The use of Weightometers at this plant by their application to the weighing of sulphur is an entirely new departure for Pacific Coast mills, as the usual practice to date has been confined to the slow and expensive method of hand weighing and all its inaccuracies.

With the introduction of Merrick Weightometers for the service at this point, these wasteful factors have been entirely eliminated, as the Weightometer is practically infallible and the totalized weights are constantly available.

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FUTURE MEETINGS

NEW ENGLAND SECTION, Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Nonotuck Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION, Technical Association of the Pulp and Paper Industry—Fourth Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION, Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway, Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION, Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park-American Hotel, Kalamazoo, Mich.

THE MILL NUMBER

This is the Annual Mill and Mill Equipment Number of the PAPER TRADE JOURNAL. This number has been issued regularly in the fall for the past twelve years, with the exception of two years ago, when, owing to the depression, the material available was not adequate for this purpose. Last year the Mill Number contained 118 pages and the Mill Number this year contains 160 pages, which furnishes another reliable indication that the pulp and paper industry is rapidly returning to its normal condition.

The Mill Number is intended to visualize by descriptive articles and pictures the new mills that have been built in the recent past, mills that are in process of erection at the present time and improvements that are being made to going mills. No Mill Number in the past certainly has made such an impressive showing along these lines as does the present issue.

Comprehensive articles are printed regarding the new unbleached sulphite pulp mill of the Pulp Division of the Weyerhaeuser Timber Company, at Everett, Wash., which went into operation in the summer; the kraft pulp and paper mill of the Union Bag and Paper Corporation of Georgia, Savannah, Ga., which was formally opened October 1; and more or less extensive mention is also made of the new bleached sulphate mill of the Champion Paper and Fibre Company at Pasadena, near Houston, Tex.; the sulphate pulp and kraft paper mill of the Crossett Paper Mill Division of the Crossett Lumber Company at Crossett, Ark.; the kraft pulp and paper mill of the West Virginia Pulp and Paper Company at Charleston, S. C.; the sulphate pulp mill and kraft paper and board mill, which will be the largest of its kind in the world, of the Southern Kraft Corporation at Georgetown, S. C.; the bleached and unbleached kraft pulp mill of the Brunswick Pulp and Paper Company at Brunswick, Ga.; the kraft pulp and paper mill of the St. Joe Paper Company at Port St. Joe, Fla.; the kraft pulp and paper mill of the Container Corporation of America at Fernandina, Fla.; and the board mill of the Kieckhefer Container Corporation, to be built at some point in the South not as yet definitely determined.

As may be seen from the foregoing this makes nine great kraft mills which have just been completed, are in process of erection or that will be built in the immediate future in the South at an estimated cost of more than $50,000,000. Also, according to a statement by Dr. Herty, announcement of another mill to be built in Texas may be expected soon.

Almost certainly such rapid development as the development of the kraft industry in the South at the present time has never previously taken place elsewhere in the history of the pulp and paper industry. Fortunately all of the concerns which are interested in this development in the South are substantial concerns and, with a single exception, long experienced elsewhere in the manufacture of pulp and paper. It is fair, therefore, to assume that the kraft industry will not suffer any demoralization from this truly marvelous development in the South.

The Mill Number contains many other evidences of progress, improvement and expansion which probably could not be visualized so impressively in any other way, and, seemingly indicate that a period of activity greater than any ever known may be expected in the immediate future by the pulp and paper industry.

PAPER WELL AHEAD OF YEAR AGO

Although normal seasonal influences reduced summer activity in most lines of paper, operating levels were still well ahead of those for the corresponding period a year ago according to the Standard Statistics Company. This trend is indicated by the following changes in daily average production rates for July, 1936, as compared with July, 1935; Printing papers, +9.1 per cent; fine papers, +18.1 per cent; wrapping papers, +11.4 per cent; boards, +23.2 per cent; miscellaneous papers, +18.7 per cent.

Reflecting the relatively satisfactory seasonal demand, prices remained generally stable at levels affording adequate profit margins for the majority of producers. Third quarter profits, shortly to be reported, are expected to show good gains over those for the third quarter of last year.

Based upon current trends, demand for paper should be excellent in the final months of the year. Magazine advertising promises to expand materially during the fourth quarter, while prospects of the best holiday trade

at retail since 1929 indicate a sharply improved demand for printing papers, wrapping papers, and bags, as well as for shipping cartons. Peak demand for the latter and for other paperboard products will be felt in October and early November, as packing requirements for holiday shipments are filled. Moreover, generally increased industrial activity in the current quarter, with its resultant enlarged public purchasing power and the increased shipments of manufactured goods, will provide excellent marketing opportunities for kraft, paperboard printing and fine papers.

Total United States and Canadian newsprint output for the current year to date has approximated that for the similar period of 1929, with production totaling 2,983,219 tons for the first nine months of the year against 3,032,629 tons for the corresponding months of 1929. Canadian output of 2,303,176 tons for the nine months ended September, 1936, was considerably above the previous high for such a period of 1,993,881 tons, reached in 1929. United States production, however, continues at levels equivalent to about two-thirds of 1929 output, and totaled only 680,043 tons for the first nine months of the year.

Beginning with the first of 1937, a price of $42.50 a ton for newsprint will become effective, as compared with the present price of $41. Although this increase is not large, it should allow for considerably improved earnings on the part of producers and may, in some instances, permit some profits for senior equities. Furthermore, while the establishment by one leading western concern of a non-contract price of $46 a ton for newsprint for next year will contribute only in a limited degree to earnings, it affords a fair indication of the improved position of newsprint, and provides the basis for anticipating a further increase in the quotation in 1938.

Gross income for 1936 for most paper companies will show a substantial gain over that for 1935, while the generally higher rate of activity plus improved mechanical efficiency should allow for proportionately satisfactory increases in operating income. The full benefits of this betterment will not be carried to net income, however, in view of the materially enlarged tax expense for 1936. In this connection, moderate extra dividend disbursements are likely to be paid to stockholders along with forthcoming regular payments in order to avoid as much as possible the tax on undistributed profits.

Soundview Pulp Co. Reports Gain

The Soundview Pulp Company reports September net profit of $48,050 after depreciation, interest and income taxes, but before deducting provision for surtaxes on undistributed earnings. This is equivalent to 46 cents a share on 104,625 shares of capital stock, and compared with a net of $49,501, or 47 cents a share, in August, and a net of $25,328, or 30 cents a share on 83,700 shares, in September last year. The company reports that production in September amounted to 5,829 tons and sales of 6,067 tons. In August production amounted to 6,107 tons and sales totaled 6004 tons.

Production Ratio Report

The statistics are based upon paper production reports to the American Paper and Pulp Associations.

COMPARATIVE MONTHLY SUMMARIES

Month	1936	1935	1934
January	76.1%	65.8%	.....
February	77.9%	70.0%	.....
March	76.0%	70.5%	.....
April	82.3%	70.0%	.....
May	81.6%	69.4%	.....
June	80.7%	72.3%	.....
July (b)	80.0%	67.8%	.....
August	81.5%	70.9%	.....
September (c)	84.1%	75.0%	59.4%
October	.....	75.6%	64.7%
November	.....	75.3%	61.7%
Year	.....	71.2%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1936		CORRESPONDING WEEKS, 1935	
*October 3	85.3%	October 5	75.2%
*October 10	86.6%	October 12	76.3%
*October 17	86.9%	October 19	74.8%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks		
Ratio Limits	Oct. 3, 1936	Oct. 10, 1936	Oct. 17, 1936
0% to 50%	67	49	42
51% to 100%	257	266	204
Total Mills Reporting	324	315	246

* Subject to revision until all reports are received.
These data exclude (a)—Christmas Day, (b)—Fourth of July, (c)—Labor Day.

Paperboard Operating Ratios

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours," were as follows:

Month	1936	1935	1934	Month	1936	1935	1934
January	61%	61%	....	July	69%	59%	....
February	67%	67%	....	August	75%	65%	....
March	68%	67%	....	September	....	69%	62%
April	70%	61%	....	October	....	76%	63%
May	68%	61%	....	November	....	70%	56%
June	68%	65%	....	December	....	60%	(a)53%

Week ending Sept. 5, 1936—78%
Week ending Sept. 12, 1936—66%
Week ending Sept. 19, 1936—81%
Week ending Sept. 26, 1936—82%
Week ending Oct. 3, 1936—80%
Week ending Oct. 10, 1936—81%
Week ending Oct. 17, 1936—81%

Aetna Paper Co. Completes Improvements

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, October 26, 1936—The Aetna Paper Company's improvements, including the installation of new boiler equipment, have been virtually completed and the plant is operating at full capacity. Business has improved considerably and indications point to a steady continuance of betterment in trade conditions, it is reported.

The company has had an unusually successful period of activity, however, during the past several years. Only for a very brief time during the height of the depression has the company failed to operate at 100 per cent capacity. This covered a period of only a few days, a record probably not excelled in any paper mill section in the country.

Howell Howard, an official of the company, reports rag content prices advancing and market condition improving substantially.

The Aetna mills, the leading industry of its kind in this section, have been modernized throughout in recent years. The latest improvement including two large V and W boilers and ash-handling system.

At no time during the past year has there been a lessening in activities at the plant and probably no Dayton concern has continued so uninterruptedly.

"WORDS CANNOT EXPRESS THE VALUE OF THIS BOOK TO INDUSTRY" *

"The exhaustive technical data this book contains will be of considerable value to us in the course of our business."*

"The book is certainly a valuable and convenient source of information for present and future use. One can safely say it exceeds the details given in advance notices."*

"I want to compliment you on the splendid job which was done in accumulating the information in this book. ... certainly reflects credita... the effort which it must ... taken."*

"I'm sure this publi... will be interesting ... lightening to anyon... have use for caust...

"This is a very interesting brochure on the subject and we hope that conditions will permit us to change over to the liquid product within a few months."*

"...oved to be so interesti... we would ask you to ... us four more co... of our fore-m...

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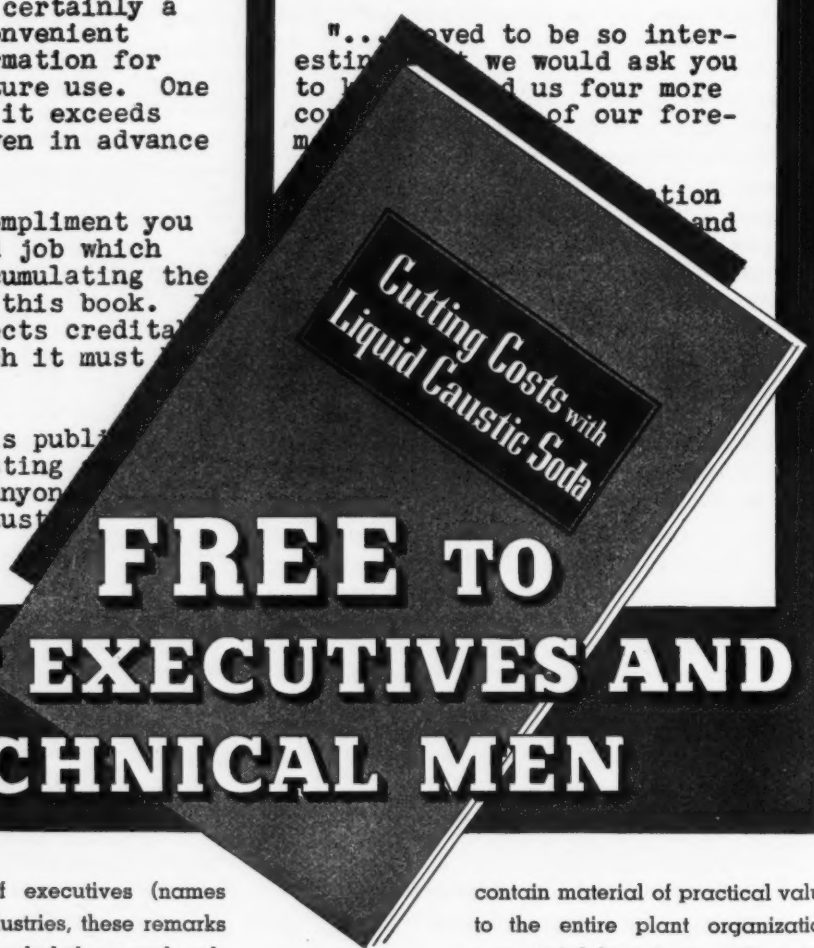


FREE TO PLANT EXECUTIVES AND TECHNICAL MEN

* Quoted from the letters of executives (names on request) in a variety of industries, these remarks typify the warm reception accorded the new handbook, "Cutting Costs with Liquid Caustic Soda." Executives, buyers, chemists and operating men alike are enthusiastic about this new book which they find packed full of useful information for both present and potential users of liquid caustic soda. Its 72 pages contain material of practical value to the entire plant organization—material based upon the wide experience of the Mathieson technical staff and upon data gathered from authoritative reference sources.

This book will be sent upon request to anyone interested in the use of liquid caustic soda. If you have not already received your copy why not send for it today?

The MATHIESON ALKALI WORKS (Inc.), 60 East 42nd St., New York, N. Y.

Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

The Control of Air in Machine Room Ventilation and Drying*

By H. G. Rappolt[1]

Why is so much air used in the machine room? Although there are still some mills not handling enough air to obtain proper ventilating and drying condition, there are many mills actually using too much air, and paying a costly penalty for doing so. What can be done to reduce this volume? To answer this requires a study of the functions of the air and the methods of handling it.

Functions of Air

Air must be exhausted from the machine room to carry out the water vapor arising from the driers and from the wet end. An equal amount of air must be taken in from outside in order to prevent excessive indrafts of cold air with accompanying discomfort, fog and drip. This make-up air, by its correct application, can be made to help in the drying of the paper in addition to its prime function of replacing the air exhausted.

Methods of Exhausting Air

(1) Natural Ventilation

Some mills still operate with natural ventilators, or just long rectangular openings or monitors in the roof. The stack effect is greatest in the winter time when there is a large difference between the specific weight of the air inside the building and that outside. This is the time of year, during which we require the least exhaust, due to the low moisture content in the cold outside air.

In the summer time, the stack effect is the least, which is just opposite to the exhaust requirements. Thus, a natural ventilating system designed for summer conditions, will exhaust far too much in the winter, due both to the greater carrying capacity of the air at that time, and to the increased stack effect. The result is a higher cost of room heating than is necessary.

(2) Constant Volume Fans

These may be either of the disc type or of the centrifugal type, both handling practically a constant volume throughout the year. The disc type, however, if not properly located, may be affected by a strong wind blowing against it, and the volume will be reduced. An exhaust fan is always selected to handle enough air for the summer conditions, and again too much air is discharged in the winter time.

Control of Exhaust Volume

Automatic controls can be used to keep the exhaust volume down to an economical minimum, during cool dry weather, or during periods of reduced evaporation. It so happens that in the range of temperatures used for exhausting from the paper machine, a constant wet bulb depression corresponds closely to a constant relative humidity. Thus we may use a wet and dry bulb recorder controller, operating on a constant depression, and have this instrument control a damper in the exhaust duct. The same instrument can control a recirculation damper in the supply system in order to maintain balanced room conditions. This damper arrangement in connection with a room thermostat controlling the steam to the heating coils, will permit definite savings in steam consumption in the reheating coils.

Amount of Air Exhausted

For a given evaporation, the quantity of air exhausted is determined by the following factors:

1. Room working conditions desired.
2. Outside temperature and humidity.
3. Type of enclosure of driers.

(1) Room Conditions Desired

The temperature and humidity in the machine room varies considerably in each mill. Some extremely hot and humid rooms are found, and yet the management does nothing about it, believing that they are operating at the highest thermal efficiency, but overlooking the effect on the personal efficiency of the operators. The majority of mills, however, are maintaining comfortable conditions in the machine room, which for a northern mill would be about 80 deg. F. and 40 per cent relative humidity in the winter, and 85-90 deg. F. 50-60 per cent humidity in the summer.

(2) Outside Conditions

The outside temperature and humidity varies greatly from winter to summer, the moisture content ranging from zero grains to about 8 grains per cubic foot. We cannot control this variation, but we can control the volume of exhaust to balance its effect.

(3) Drier Enclosures or Hoods

(a) Open Machine

There are still a number of drier nests, especially on

* Presented at the meeting of the New York-Canadian Division of the Am. Pulp & Paper Mill Supts. Assn., Niagara Falls, N. Y., Oct. 27, 1936.
[1] J. O. Ross Engineering Company, New York, N. Y.

board machines, having no hoods whatsoever. The exhaust air from the room is comparatively dry, and low in temperature; necessarily so to prevent condensation on the roof and other parts of the building. The ventilation costs are proportionately high, as a large volume must be exhausted, requiring more heated makeup air.

(b) Open Hood

Under this classification come a number of old design hoods, not having sufficient overhang and side drops. The exhaust volume is less than with no hood, but ventilation costs are still higher than need be.

(c) Well Designed Balanced Hood

This type hood is considered practically standard, the exhaust air being at a minimum for good room conditions, uniform drying, and maximum accessibility.

(d) Cross Ventilation Type

A higher exhaust temperature is maintained, but the front side of the sheet dries much more than the back side. The troubles caused by this uneven drying more than offset its advantages of higher exhaust temperature.

(e) Enclosed Machine

Numerous attempts have been made to cut down the required exhaust volume by enclosing the driers more or less completely. There were many reasons why these attempts have been unsuccessful, the principal ones being discomfort of the operators, and lack of accessibility to the driers.

If the objections could be removed, substantial savings could be made, both in the initial cost of ventilating equipment, and the operating cost, which includes steam and power. It must be kept in mind that there still is a ventilating problem due to wet end evaporation, and a room heating problem, but the total requirements are less severe.

Serious thought is being given to removing the objections to a complete enclosure. A system is being worked out in detail to use automatic motorized drop curtains in the front, the whole front opening up when a break occurs. This, in principle, is what must be accomplished to make a total enclosure practical.

Supply Air

The use of an enclosure changes somewhat the general picture of make-up air from outside. Since it is a recognized principle that the make-up air should balance the exhausted air, the amount of outside air would be decreased as the exhaust requirements become less. This would alter the balance or arrangement of the two main applications of the air, namely, to the roof, and to the machine.

ROOF SUPPLY

Air would still be supplied to the roof to prevent sweating from the wet end evaporation. This would have to be dry air taken from outside to keep the temperature at the lowest practical figure. It is very desirable to have a well insulated roof, to minimize the temperature required to prevent condensation.

Automatic control can be used to advantage to regulate the temperature of the air delivered to the roof by a thermostat operated from the room temperature. This will result in a direct saving in the amount of steam used in the reheating coils.

AIR SUPPLY TO MACHINE

Some make-up air is delivered to the paper machine, to assist in the drying, thus making double use of the air. It is either applied to the pockets or in the pit.

AIR TO THE POCKETS

On a board machine, where there are no felts, nozzles are extended across the sheet, in the pockets, and a curtain of air blown against the sheet. On a paper machine, the felt rolls take up considerable space in the pockets, and it is generally considered impracticable to use cross nozzles, except in extra large pockets. A system using high pressure air jets blowing alternately from front to back in adjacent pockets, is used to clear out the vapor, and assist in the drying.

AIR TO THE PIT OR FELTS

The present tendency is to use more air on the felts, the amount actually having been doubled on a recent installation with exceptionally good results. The air applied at this point increases the drying capacity of the machine, and increases the life of the felts.

With an enclosed drier the necessity of air applied in the pit to the lower felts is even more pronounced, as this is the only source of air supply. The air may be taken from outdoors, or from the room, or from any combination of these sources to produce a balance between exhaust and make-up.

Automatic temperature control might be suggested for regulating the temperature of the air being delivered to the machine, whether it is a vapor absorption system for the pockets, or a felt drying system for the pit. The temperature might also be controlled by an instrument that controls the moisture content in the sheet.

The Economizer

The economizer heats the make-up air by the heat in the exhaust vapor-air mixture. With the enclosed drier, where the exhaust is maintained at a high temperature, it might be desirable to use two sections in tandem so that a higher air temperature can be obtained. Even with a single section the final air temperature would be higher and the amount of reheating steam would be reduced.

Re-Humidifying

In addition to controlling the moisture content across and along the sheet as it passes through the driers, it is often desirable to add moisture after the sheet leaves the driers and calender. This may be done by passing the sheet through a small chamber in which hot humid air impinges against both sides of the sheet.

A sheet high in moisture content does not cause trouble in a printing room, whereas a dry sheet is subject to curl expansion, warping, and the resultant press troubles. Control plays an important part in the proper operation of an air system for this purpose.

TABLE I

Variation in Humidity for 10 Degree Depression

Dry Bulb Temp	90	100	110	120	130	140
% Relative Humidity	65	68	70	72	73½	75

Coupled Pumps

Bulletin No. 7066 has just been issued by the Cameron Pump Division of Ingersoll-Rand Company. It covers their line of Coupled Pumps, of capacities from 150 to 5,000 gpm against heads between 20 and 250 feet.

These pumps are used for handling nearly all liquids, such as water, gasoline, brine, ammonia, fruit juices, starch, white water, naphtha, alcohol, benzine, soap liquids, dyes, cutting compound, chemicals, sugar liquors, tanning extracts, beverages, acid mine water, and many others.

The bulletin shows many views of pump installations, as well as the construction details of the Coupled Pump.

A copy of Bulletin No. 7066 may be obtained from Ingersoll-Rand Company, 11 Broadway, New York, N. Y.

The New Smith-Egan Beaters

By C. W. Smith

Efforts to improve on paper mill beating and refining have taken various directions since the Hollander beater was first used. In spite of its disadvantages, recognized by everyone in the industry, the Hollander beater is still widely used today and this is probably because it gives a type of action that so far has not been duplicated by other equipment. The Smith-Egan beaters were developed in an effort to retain any advantage of the Hollander beater, but to discard the disadvantages if possible.

Advantages of Hollander to be Retained

First of all the advantages of a Hollander, to be retained and not discarded were recognized as

1. Type of beating action
2. Flexibility in quality results
3. Ease of operation and control
4. Past experience and knowledge of the equipment

Accepting the old adage that "Paper is made in the beater," we must first concede that the Hollander action on fiber (without defining or attempting to explain it) must be desirable because it has made and continues to make good paper. In working to retain this feature, we recognize that we can possibly retain the flexibility in quality results obtainable in the Hollander type of beating action. We will then also retain the value of experience with and knowledge of the Hollander equipment which has been built up over many years.

Turning now to the other side of the picture we recognize many disadvantages of the Hollander equipment which we must improve upon or eliminate. Some of these are:

Power consumption per ton
Batch process
Tub circulation
Stock density limits
Beating without pressure
Action on individual fiber limited
Investment per ton per day
Floor space
Repairs and maintenance
Quality limitations
Control limitations
Labor costs

Power consumption is always an important item both from the point of view of costs as well as limitation of available power. In seeking equipment to do a job well, it must also do it economically to justify any investment. Beaters and jordans consume a great deal of power, particularly jordans and after all the purpose of a beater or refiner is to make a sheet of paper as cheaply as possible.

The batch process versus the continuous process will always be a problem. In some mills a batch process must be used, but where continuous can be adapted many advantages ensue. In the development of the Smith-Egan beaters, the continuous process was developed successfully. Then some steps were retraced to apply successful fundamentals to a batch unit. In some mill problems a batch system can be used to advantage, in others continuous, and in many cases a combination of continuous and batch. This will be discussed later.

Tub circulation has long been recognized as a waste of energy (in the Hollander tub). In reality the roll of a beater acts as a pump as well as a beater. Can this pumping function be eliminated or can the efficiency of the pump be raised?

Stock density in a Hollander is limited to low consistencies. If we can find a method of beating stock at 10 or 12 per cent or higher, successfully and economically, we bring to the beater a wide range of possibilities, from low to high consistencies, wherein different results as desired can be obtained at various densities.

Much work has been done on refining under pressure, particularly with the jordan. The open tub Hollander cannot be used for pressure beating. Therefore, unless we have some means of beating under pressure, this field would be closed to us.

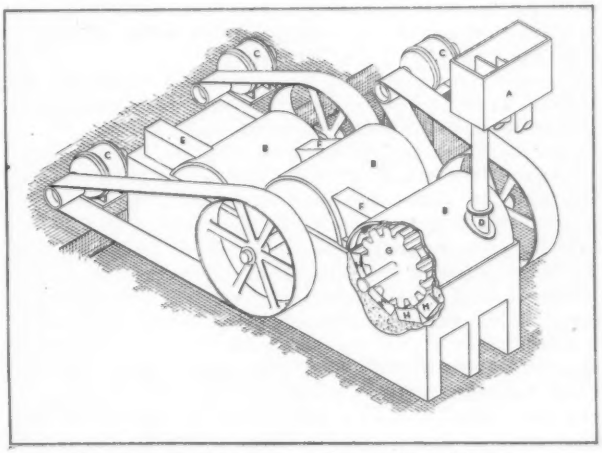
Statistically speaking, a fiber gets very little action in a Hollander beater. One shot through the roll then a long ride between shots.

Any investment figure (for equipment) when reduced to a figure per ton per day gives a better picture of the actual expenditure. That should be the criterion.

Floor space is at a premium in many mills. It is and should be valued and charged against any equipment or process. Any saving in floor space is a profit which should be calculated at its true value.

Repairs and maintenance on beaters may not be considered high considering the usual long life of a beater, but actual expenditures are not the only important item. If a piece of equipment needs repairing or replacement of parts, it is evidently not running at its greatest efficiency. Low maintenance and repairs indicate, therefore, the relative efficiency as being greater. If a design is efficient it should be low in repairs and maintenance (on a per ton per day basis). This is something to watch for, not only for its absolute value in costs, but as an indication of good operation.

In a Hollander beater, there are definitely known limits of quality under present practices. Likewise, methods of control and variation are limited. If greater control of quality can be obtained, the dependence on so-called art will be reduced and results more nearly duplicated at different times. In respect to quality limits, cellulose fiber has qualities which are sometimes destroyed mechanically. Tear for instance is reduced under present practices, as hydration is developed. Is this necessary? Or if it is, can the extent of this destruction of value be reduced to a minimum? In respect to control, can we not eliminate at least some of the variables in beating so that we can duplicate to a greater degree than we do in the Hollander beater. Uniform paper is better paper than paper that is good one day and bad the next. If we can list ten mechanical variables



Diagrammatic Scheme of Smith-Egan Beater.

in beating, then eliminate five we have gone a long way toward reducing the extremes of quality.

An important part of beating cost is labor. Not only of itself or per ton, but also in the dependence on the human element. It may sound Utopian to speak of a beater which is started and set on Monday and not looked at till the switch is turned off on Saturday. This is actually being accomplished.

Having considered the items that we are aiming at, let us look now at the Smith-Egan beaters and see how far we can go in retaining what we want of the Hollander beater and discarding what we do not want.

Both the continuous and the batch beaters are constructed of conventional type equipment in a new arrangement and combination; each are the same in fundamentals but so constructed for continuous or batch operation, whichever is preferred.

The Smith-Egan Continuous Beater

The continuous beater is composed of two or more units in series. The three roll design has so far proven most useful. This type consists of three conventional type beater rolls arranged in vertically stepped relationship, each roll being completely enclosed in a chamber, except for a stock inlet and outlet. The rolls do not necessarily have to be vertically stepped. A horizontal arrangement works satisfactorily. In fact, under some conditions a vertically stepped relationship in reverse order might be advisable. Each roll has a bed-plate which embraces a substantial arc of the roll. This bedplate can be in three or more sections, each section being approximately equal to what is currently known in the industry as a bedplate. Therefore, the beater can, in effect, be said to have three or more bedplates on each roll. The roll is carried on typical type shafts and bearings, each roll being driven by its individual belt drive or motor. The bottom of each chamber can be formed of a cement or concrete base in which the bedplates are set. Cast iron, steel or wood construction will probably be as satisfactory for the base, and in some cases might be better. The top wall of each chamber (wood or iron construction) extends concentrically over the top of the roll. The top wall is so constructed as to provide a uniform space over the top of the roll, in the portion of the chamber not occupied by bedplates. The inlet for the first chamber is placed adjacent one end of the roll so that the stock flows under pressure tangentially toward the roll. The outlet for this chamber is adjacent the other end of the roll and opens directly to the second chamber, the flow of stock being by gravity and pressure into the next chamber. The second chamber inlet, therefore, is adjacent to the first chamber outlet. The outlet for the second chamber is adjacent to the inlet for the third chamber and so forth according to the number of chambers in any particular installation.

The stock source for any series of chambers consists of a typical headbox unit or any device that can furnish slush stock uniformly in amount and pressure.

The final outlet for the series of chambers can consist of one of several types of devices. The simplest is a movable dam gate that causes the stock to flow over a baffle wall, raised or lowered to obtain the desired back pressure.

Under present practice the roll is rotated at conventional speeds and in the same direction as a Hollander type beater.

The stock is carried from the inlet directly to the bedplates. The pressure of the stock (head and back) tends to drive the stock over and across the roll in a spiral fashion, with the result that the stock passes between the bedplates and roll a plurality of times before reaching the outlet of the chamber. This same action is repeated in each subsequent chamber, until the stock reaches the final outlet and flows to a chest.

The above description covers substantially the fundamental description of equipment and action. There are, however, other details of operation and control which should be described.

Control of production in quantity and quality is arrived at by a combination of controllable factors, each factor having a wide latitude of variation according to results desired. These will be first enumerated and then described.

Roll fillings
Bedplate fillings
Consistency of stock
Roll pressure on plates
Speed of rotation of roll
Head pressure
Back pressure

FILLINGS: In a three roll unit it would be possible to install three different types of roll and plate fillings. Thus it is possible in one operation to combine the advantages of different types of fillings according to the condition of the stock at the time it passes through each chamber. This beater contemplates the use of slush or wet shredded stock. One mill has successfully furnished shredded broke through the headbox. The first roll can be so set and filled to complete the disintegrating and separation of fibers. The second roll can be filled and set to brush lightly. The third roll can be filled and set to hydrate severely. Or the second roll can be filled and set to hydrate, the third to cut. There a multiplicity of combinations both as to degree and order.

STOCK CONSISTENCY: This beater has been successfully operated at conventional consistencies (three to six per cent) and up to eight per cent. It is believed that higher is possible and further experiments are being conducted to prove results. It is even possible to change consistency during the beating operation. This introduces to beating a wide factor of variation in operation and control of results that has almost limitless possibilities in new results that can be obtained with the cellulose fiber.

ROLL PRESSURE: Each roll can be set independently of the other units. Setting is accomplished by a balance weight putting downward leverage on the roll shaft. In the conventional beater the roll must be held up. In this beater, the film of stock acts similar to lubrication for the periphery of the roll, and if desired the roll will never of its own weight contact the plates. This is new and revolutionary but a retention of the accepted beating action—roll weight pressing on and rubbing the stock.

One important feature should be mentioned here; the roll once set for desired results does not have to be changed. Or, expressing this in another way, a desired roll setting once determined can be repeated at will, an approach to making the beater a precision instrument. This feature of variation is one also of perfect control.

There is no temperature problem involved in the operation of this beater as the stock is not in the beater long enough to build up any undesirable temperature.

SPEED OF ROTATION OF ROLLS: As each roll is individually driven, the rotation of each can be controlled independently. This makes it possible to vary the back pressure of the preceding chamber or head pressure to the next succeeding chamber. This will alter results as desired in quality and quantity of output.

PRESSURES: Head pressure can be arrived at and controlled by various means known to the papermaker. One type of control would be a headbox with baffle dams (adjustable if desired) with a pipe inlet to the beater so constructed to give the quantity desired at any given pressure. Back pressure is affected and controlled by the speed of the roll and the pressure built up at the outlet. The net effect of head pressure and roll speed minus back pressure will control the quantity of stock passing through each chamber per minute, as well as the number of times each fiber passes

between roll and bedplates, in other words, the number of spirals the stock will perform. Thus the greater the passage of stock through and out of the chamber at any given consistency the lesser the number of times the stock will be acted upon and vice versa. This pressure balance is substantially the production control lever (quantity). If it is desired to have quantity of output at a constant figure, then other variations permit control and variation of hydrating effect. However, this pressure balance can be used as a quality control if so desired and production of any given amount can be obtained by other variables in the apparatus.

The Smith-Egan continuous beater is not a breaker beater or "refiner." It is essentially a beating and hydrating apparatus retaining the advantages of the Hollander type beater and discarding the major disadvantages of the Hollander type beater.

Returning again to our enumeration of the disadvantages and advantages of Hollander beating let us see what is actually accomplished in the Smith-Egan continuous beater.

POWER CONSUMPTION: Many points of theory can be cited to show why power consumption per ton of stock will be considerably reduced by the Smith-Egan continuous beater. The fact is that it has reduced power consumption on some jobs as much as 60 per cent. A very conservative average figure is 35 per cent. It is obvious that the longer the present beating cycle, the greater the per cent of saving per ton of stock. Whereas, time in a Hollander beater is figured in hours, this beater figures it in minutes.

BATCH PROCESS: Where it is possible to dispense with the batch process there is a great deal of saving in labor, space, power and time. However, under some mill conditions a batch process is necessary in spite of its disadvantages. The Smith-Egan batch beater retains the basic advantages of the new type of beating. However, where it is possible to use a continuous process, the full advantage can be obtained by the Smith-Egan continuous unit. Where dry stock is presently furnished to beaters, some mills are dependent on a batch process for breaking up and disintegrating the stock. Advance practice indicates that such breaking down and wetting is more efficiently done in one operation in a machine designed to do that alone, and such an operation should not be performed in beating apparatus at the expense of beating equipment (tackle, power and maintenance). After the stock is reduced to slush form by the most efficient method, the batch or continuous beating process can be used. Where, however, the continuous process can be used it will show best results.

TUB CIRCULATION: The circulation of stock around a beater tub by a beater roll has been recognized as a waste. The elimination of this practice results in considerable saving of space, time, power and investment.

STOCK DENSITY LIMITS: In a Hollander type beater there are known limits of density. Let us say 6 per cent. The Smith-Egan Beater raises the limit considerably without affecting the lower brackets. Eight per cent is known to be successful. The upper limit has not yet been reached. It may be 10 or 12 per cent or more. That depends on the stock, the results desired, and more study of the equipment under various mill conditions. Where beating under low consistency is desirable, all the advantages of Hollander type beaters are retained with a further important addition that the consistency can be lowered during the beating process if final cutting action is desired.

PRESSURE BEATING: Beating under pressure is recognized as a distinct advance in paper mill practice. It cannot be done in a Hollander type beater. It can be done and varied as desired in the Smith-Egan beaters.

ACTION: In a Hollander beater the theoretical number of times that a fiber passes between bedplates and roll is very low. By elimination of unnecessary circulation, the addition of multiple bedplates and pressure, the Smith-Egan continuous beater multiplies this action considerably. There is likewise ample time between roll plate passages to allow fiber expansion.

INVESTMENT: The amount of money invested in a piece of equipment must be figured on a per ton day basis. Also the value of floor space should be charged against the equipment for comparative purposes. Investment in motors, and stock chests should also be considered. The Smith-Egan beaters will represent to any mill considerably lower investment in two ways:

1. Per ton per day, and
2. In total.

In one mill it did the work of four beaters.

FLOOR SPACE: One Smith-Egan continuous beater takes up not much more than one-half the space of one large Hollander beater. But it will replace many Hollanders. Therefore, the comparison on per ton per day figures from 15 per cent to 25 per cent of the absolute floor space. This is very important where floor space is at a premium.

REPAIRS AND MAINTENANCE: Again theory can be quoted to show why repairs and maintenance are low on the Smith-Egan beater. It may seem strange to observe that the Smith-Egan beater is relatively noiseless. Any "sound" engineer recognizes that quiet operation means low repairs and maintenance. Wear on tackle is low because of little contact and practically no friction of beater parts. Nor is there any braking action by pressing bedplates against a revolving roll. In each chamber the roll turns over and rubs the stock, not the bedplate.

QUALITY LIMITATIONS: The Smith-Egan beater definitely makes possible higher tear values at any given mullen. Better mullen and fold are obtainable because better hydration is performed. Control of quality is even more important.

CONTROL: Control of the Hollander beater is still an art. The Smith-Egan beater retains the art but adds scientific beating because the precision of control is finer and once the desired objective is reached it can be retained without change.

STOCK GRADES: Many refiners, hydrators and jordans limit the papermaker to certain types of treatment. Every papermaker has his own way to get the results he wants, every mill is a different problem, every paper machine is a different problem. The Smith-Egan beater is flexible enough in known and understood factors to answer the need of a wide scope of conditions. Beating, as such, is unchanged in principle in the Smith-Egan beater.

The Smith-Egan Batch Beater

Where batch beating is desired because of certain mill conditions, most of the advantages of the Smith-Egan principles can be retained.

The batch unit consists of a one roll beating chamber and a circulating tub. The beating chamber is constructed along the same lines as each chamber in the continuous process, the tub being a separate stock container independent of the beating chamber.

The stock is furnished in slush or semi-slush form to the tub. This tub is similar to the present type of Hollander beater tub in that it is of an elongated design with a midfeather about three-fourths of its length. The bottom of the tub, however, is of a sharp pitch to facilitate gravity flow.

The stock drops into a pump below the tub and is pumped to a headbox above the beating chamber which is located across one end of the tub, three to six feet above the top level of the stock. The headbox is three to ten feet above the beating chamber, according to the constant head pressure desired.

The stock flows by head pressure through a pipe inlet adjacent to one end of the beating chamber. After passing between the bedplate and roll, the stock comes up over and then around the roll through the plates and roll again. The flow of the **stock in spiral fashion around** and across the roll repeats the beating action a plurality of times.

When the stock reaches the other end of the roll it passes over a dam (controlling back pressure) and drops to the tub. The stock then flows around the tub and thus back to the pump. The construction of the tub is such that no pockets are formed and all stock is treated uniformly.

The capacity of the beater is variable according to results desired and the number of times it is necessary to pass the stock through the beating chamber.

Circulation is very rapid because of the efficiency and capacity of the pump, the quick action of the beating chamber, and the sharp pitch of the tub bottom.

While results of this unit are not quite as attractive as the continuous process in the way of lowest cost, the results to date prove that this batch is far ahead of other batch beaters presently used in the industry. The batch process definitely lends itself, however, to grades that must be produced in small quantities for various reasons.

One application of batch beaters has proven quite successful. In this mill various grades of paper are made from the same raw stock each grade requiring a different beater degree. Expressing beating degree in terms of freeness this mill found that all their grades were beaten to a freeness of 300 or lower. They installed a continuous unit so operated that all their stock was reduced to 300. Then where 300 freeness from beating was used this stock was not further beaten. When, however, a sheet was being made requiring 250 freeness for one paper machine and 200 on another, the stock at 300 freeness was pumped to batch beaters, where each batch was reduced another 50 or 100 points as needed for each respective paper machine.

It is the desire of the inventors that the benefits of this apparatus be available at low cost to the entire paper industry. Several manufacturers have already contracted to manufacture and merchandise this equipment under the Smith-Egan patent. While it is recommended that licensed manufacturers be contacted for further information, the inventors will be glad to furnish further data if requested. Licences have been granted to the Mid-West-Fulton Company, Dayton, Ohio, and to the D. J. Murray Manufacturing Company, Wausau, Wis.

Orders for Oliver United Filters

Oliver United Filters Inc., has in the more or less recent past received orders from the following representative paper concerns:

Union Bag and Paper Company, Savannah, Ga.; Port Royal Paper Company, St. John, N. B.; Champion Fibre Company, Canton, N. C.; Brompton Paper Company, East Angus, P. G.; Sonoco Products Company, Garwood, N. J.; Howard Smith Paper Company, Cornwall, Ont.; S. D. Warren Paper Company, Cumberland Mills, Me.; Kimberly Clark Paper Company, Neenah, Wis.; Allied Paper Company, Kalamazoo, Mich.; Champion Fibre Company, Pasadena, Texas; International Paper Company, Cornerbrook, N. F.; Soundview Paper Company, Everett, Wash.; Weyerhaeuser Paper Company, Everett, Wash.

The filters sold to these companies include: Oliver Deckers, Washers, Savealls and Lime Mud Filters; also Oliver-Young Washers and Deckers. Some of these units are rubber covered.

Several mills also purchased Sweetland Pressure Filters for handling special lime-mud.

History of Soda Pulp Manufacture

The following letter from George Carruthers of the Interlake Tissue Mills, Merritton, Ont., has been received by the Technical Association and is published herewith so that anyone who may have reliable information on the subject can assist Mr. Carruthers in completing his records.

Mr. Carruthers is preparing a history of pulp and paper making for publication and needs this information. Anyone having data is requested to send it either to Mr. Carruthers or to R. G. Macdonald, secretary of TAPPI, 122 E. 42nd street, New York. The inquiry follows:

Dear Mr. Macdonald:

An article in *Wochenblatt fur Papierfabrikation* 1931, p. 280, states that the first patent for soda pulp was granted on August 3, 1830 to Wooster and Holmes, Crawford, Pa. I have been wondering if you could ascertain for me what became of Wooster and Holmes patent. They may never have made pulp outside of the laboratory.

So far as I am aware Wooster and Holmes was the first patent which was taken out on soda pulp. A later patent on soda pulp process was taken out by Charles Watt and Hugh Burgess. They received a patent in England on August 19, 1853, and in the United States on July 18, 1853. According to the History of Paper Manufacturing in the United States, 1690-1916 by L. H. Weeks, New York, 1916, pp. 226 the following appears:

"Several years of seemingly fruitless experimenting principally in the town of Reading, England, preceded the final success of Hugh Burgess and his partner, Charles Watt, in making pulp from wood by chemical process. In 1851 they were at last able to show good pulp by their method, and from this, white paper, suitable for printing, was made in a paper mill at Boxmoor, Hertfordshire, England. Part of a weekly issue of The London Journal was printed from this paper and it passed the test full well. . . . "

My friend, Mr. Fox of the Paper Makers Association of Great Britain and Ireland, can not trace any mill at Boxmoor. It happens that his earliest directory is 1853, but he is still making further inquiries from the mills in the neighborhood, and will let me know if he finds out anything of interest in this connection.

I may say in connection with Watt and Burgess that they operated a mill for a number of years at Royer's Ford, Pa., and it is recorded that this mill was a going concern in 1860.

If you can put me in the way of getting a picture of Watt or Burgess or both, I should appreciate it very much.

Yours very truly,

GEO. CARRUTHERS

October 14, 1936

Self-Curing Rubber Reduces Shrinkage

Selfvulc Plastic Rubber is being quite extensively used in the paper mills and has proved very satisfactory and economical. It is manufactured by the Self-Vulcanizing Rubber Company, Inc., of Chicago, Ill.

This company announces an important development and refinement in its plastic rubber. The shrinkage of its cold, self-curing process has been reduced to about one-third that heretofore common in the application of rubber coatings and linings.

The products of this company are used for resisting either abrasion or corrosion conditions. Applications which have proved satisfactory are for conveyor belting, lining tanks, tubs, covering ducts, blowers, fans, and many other places.

Absorbent Pulp and Paper Patent Decision

U. S. Patent Office Board of Appeals Confirms Ruling of Examiner of Interferences Awarding Priority of Invention as to All Counts in Issue to Joseph E. Plumstead, of the Jessup & Moore Co., of Philadelphia.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., Oct. 26, 1936.—The Board of Appeals in the United States Patent Office rendered a decision under date of October 22, confirming the decision of the Examiner of Interferences in the case of Frank H. McCormick and George L. Schwartz of E. I. duPont de Nemours & Company, Wilmington, Del., vs. Joseph E. Plumstead, an officer of the Jessup & Moore Paper Company of Philadelphia, awarding priority of invention as to all the counts in issue of Mr. Plumstead.

This decision concerns Patent Interference No. 64,904 between the application of Messrs. McCormick and Schwartz, filed April 30, 1932, Serial No. 608,522; and the application of Joseph E. Pumstead, filed March 23, 1933, Serial No. 662,365, for the re-issue of Patent No. 1,830,131 granted on November 3, 1931, on an application filed May 9, 1929, Serial No. 361,708—Absorbent Pulp and Paper.

Appellants Contention

Of the 5 counts mentioned in Appellants' brief, two are taken as illustrative, namely 7 and 15, which read as follows:

7. The herein described method of producing puffed pulp including treating substantially dry cellulosic fibrous pulp material in a kneader with caustic alkali solution of sufficient strength such as will produce a puffing of the pulp or curling of the fibres and in such volume of solution as to produce a resultant substantially non-fluid mass containing at least 10% of fribrous material, said resultant non-fluid mass as treated being of such density that there can be no free drainage, and washing the material substantially free from caustic alkali and saponified substances.

15. A step in the method of producing puffed pulp by curling the fibers thereof, this step consisting in impregnating the substantially dry pulp with a caustic alkali solution, and maintaining the fluid content of the mass of pulp and solution in such limited amount that it will not exceed that required for probating a non-fluid mass.

It is contended the Appellants argue that there is no value in the non-fluid mass as such and Plumstead claims no value and that "non-fluid mass" refers more to a range of proportions to be used and further that because they, McCormick and Schwartz, gave direct proportions to be used rather than the functional effect thereof, they have been penalized by a holding that they never contemplated the subject matter of the invention involved.

Count 7 refers to the process taking place in a kneader and that the non-fluid mass as treated is of such density that there can be no free drainage.

Appellants rely on their disclosure of proportions only in Exhibit No. 8 to establish error on the part of the examiner. The examiner has clearly indicated in his decision that he recognized the disclosure of the proportion in Exhibit No. 8., and states that it is apparent from a reading of Exhibit No. 8 that appellants had, as of March 29, 1928, the effective date accorded this exhibit by the examiner, no conception of carrying out the processes described in this exhibit in a "kneader," or that the masses referred to in the exhibit were so treated and were of such density that there could be no free drainage.

The Southern pine kraft caustic soda solution mixture, referred to in the exhibit, merely proposes a mix of the ingredients and a run of the mixture between rolls, and nowhere in this exhibit is disclosed the idea that the mixture was put through a kneader under such pressure conditions, i. e., of such density that there would be no free drainage from the fibers.

Limitations Important

Mr. Plumstead brought out these points in the prosecution of his patent application to avoid a rejection of a claim and amended this claim in these details to render the claim allowable. These limitations are therefore of great importance in construing counts designated as 7, 8, and 13 and it is held that Exhibit No. 8 does not show a conception of the invention of these counts.

It is set forth that Appellants knew at the time that a less concentrated solution of sodium hydroxide could be used than the 18 per cent solution referred to in one of their exhibits.

Under count 14, it is construed that the ingredients are mixed in an impregnator wherein the mass is maintained as stated in the count. Merely adding the pulp to the caustic soda solution, as stated in Exhibit No. 8, will not maintain the consistency despite the fact that the ingredients are well mixed as is stated in this Exhibit. Appellants insist that "maintaining" in this connection means that "the initial ingredients of the mixture are not to be changed until the operation is complete."

Effect of Word "Maintaining"

From the viewpoint of the Board of Appeals, the effect of the word "maintaining," in count 14 is that no matter how the ingredients are handled in the impregnator the liquid content of the mass is always and everywhere maintained so that the liquid will not at any time or place in the process exceed that required for producing a non-fluid mass. Plumstead describes this effect at the top of page 3 of his original specification of his patent. In other words, the caustic solution is added only in such quantities that resultant substantially non-fluid mass will be produced.

It is set forth that Mr. Plumstead added the caustic solution to the fibers to produce a specific effect, whereas appellants add the pulp to the caustic solution in a manner which they do not disclose in Exhibit No. 8 and it further states that it is clear from this exhibit that the pulp may well have been added to the caustic solution in such manner that the liquid content of the mass would exceed that required for producing a non-fluid mass at some time or place in the process of addition.

Appellants do not establish by this exhibit that they maintained the fluid content of the mass and solution in any particular relation or that they had the idea of adding the constituents of the mix pro rata to the impregnator as the mixing operation proceeded or in adding the caustic solution to the fibers as the mixing proceeded.

In Exhibits 26 and 28, the substitution of Lannoye pulper for the beaters seems to be preferred.

It is brought out that Exhibit 25, dated March 16, 1929, is the first to indicate a proper relation between the flow

rate of the caustic solution and the pulp as 7.5 parts of solution to one part board weight of pulp. The examiner states, however, that it does not conclusively appear therefrom whether the suggestion as to the consistencies was by Plumstead or by McCormick and Schwartz, but it is the belief of the Board of Appeals that whatever presumption exists is in favor of Plumstead whose name appears on the Schwartz notebook, page 179, the run having been made at the mill of the Jessup and Moore Company. David Lindsay's name also appears on the notebook leaf and he testified that Schwartz supervised the feeding of the pulp and caustic solution to the pulper. However, no presumption is made by the Board of Appeals as to the effect of Exhibits 25, since there is nothing of record to definitely relate the mode of operation there indicated to either party.

Consistency Variation

It is pointed out by the appellants that the mere variation on the consistency of the output from the pulper does not indicate that the non-fluid condition was not maintained. On the contrary, it is the belief of the Board of Appeals that it was substantially maintained, and from the evidence presented the Board of Appeals state that they are not satisfied that the process was conceived by appellants more than by Plumstead.

The appellants argue whatever was done by Plumstead inures to their benefit because Plumstead was employed by the Jessup Moore Company. Appellants seek to establish a connection with this company by the contractual relation therewith of the Lindsay Paper Company, which in turn was employed by the Celastic Corporation to develop the inventions of Messrs. McCormick and Schwartz relating to puffed pulp absorbent paper, McCormick and Schwartz having assigned their application to the Celastic Corporation.

The ruling of the Examiner of Interferences that the junior party has the burden of proving priority beyond a reasonable doubt is clearly correct because they did not file their application until after the issue of the Plumstead patent.

On page 29 of their brief, appellants admit that they had never employed a Lannoye pulper in the operation of their process and cannot see that the contract between the Lindsay Paper Company and the Jessup and Moore Company is material to any phase of this case.

Inasmuch as the Board of Appeals finds that the appellants have not definitely established by proof that they either conceived the invention or disclosed it to Plumstead prior to the filing date of the Plumstead applications, the decision of the Examiner of Interferences is affirmed, awarding priority of invention of the subject matter in issue to the senior party, Joseph E. Plumstead.

Layne Wells and Pumps at Crossett

Prominent in the equipment of the Crossett Lumber Company's Crossett, Ark,, paper mill are eight Layne gravel wall wells and eight high efficiency Vertical Turbine Pumps. Each pump is directly connected to high power electric motors and are automatically controlled with special equipment. These eight Layne Wells and Pumps deliver more than 6,000,000 gallons of water per day.

The installations were by the Layne-Arkansas Company, Stuttgart, Ark., a subsidiary of Layne & Bowler, Inc., Memphis, Tenn.

Manufacture of Paper in India

The advantages of the use of bamboo in the manufacture of paper and paper pulp in this country were described by Mr. G. G. Gulrajaney in a paper he read on "Indian Paper and Paper Pulp Industries" at a meeting of the Technological Association (University of Bombay) at the Royal Institute of Science, Bombay, recently.

Mr. Gulrajaney said, according to the *Times of India*, Bombay, that the present world requirements and production of paper and paper products were nearly 20 million tons per annum. Over 90 per cent of the world's paper was made from wood, and therefore there was an apprehension of shortage of this material. In order to develop Indian paper and paper pulp industries, Government took the initiative and granted protection in 1925 almost entirely on the possibility of utilisation of indigenous raw materials.

There were nine paper mills in India, and their total output was 40,000 tons. The supply of bamboo now available was sufficient not only to meet the demand of these mills, but also to develop an export trade in pulp. This material was available at economic costs, and the qualities of bamboo fibres were suitable for most classes of paper in demand in this country. Besides, bamboo had the advantage of prolific growth, easy collection and transport. Paper could be made from bamboo fibres equal in quality to that produced from wood and esparto.

As regards *sabai* grass, Mr. Gulrajaney thought that the supply of this material was insufficient. Even if the supply could be increased, its cost would render any extension of the manufacture of paper from it uneconomical. Paper produced from bamboo was stronger than that manufactured from *sabai.*

Besides the supply of fibrous material, India also produced various other materials, such as rosin, lime and magnesia, for the manufacture of paper. India imported annually paper worth more than Rs. 260,000,000, and therefore Mr. Gulrajaney thought that the field for the manufacture of paper in this country was still attractive. The head of the department of chemical technology had suggested to Bombay University the extension of the activities of the Department to the manufacture of paper, and the speaker hoped that, given the opportunity, the Department would do useful work beneficial to the paper trade.

Taggart-Oswego Paper & Bag Co. Busy

[FROM OUR REGULAR CORRESPONDENT]

OSWEGO, N. Y., October 26, 1936—At a meeting held during the past week it was stated that business at the plant of the Taggart-Oswego Paper and Bag Company has been improving steadily and indications are that there will be no falling off during the remainder of the year which has been generally the case since the plant was started in this city. A. T. Plunkett, eastern manager of the company, and several members of the sales and expolitation force were here also on an inspection tour of the local plant. During their visit the delegation were the guests of Theron M. Contryman, general manager of the mill, at a banquet. Mr. Plunkett and his associates left late in the week to continue an inspection round of paper company plants which he represents. An executive of the concern declared that many of the bags being produced in the plant are shipped for use in states and parts of the country where winter weather conditions will make little difference in distribution of products they will contain.

Consolidated Plans Interest Payment On Bonds

Proposition Made to Institutional Investors Holding Large Blocks—Present Proposal Is to Pay Interest Due January, 1937 and Succeeding Five Semi-Annual Interest Payments In Common Stock At Rate of $11 Per Share.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., October 26, 1936.—Consolidated Paper Corporation will pay interest on its $51,406,900 of 5½ per cent first mortgage bonds in common stock for the next three years if proposals made by the company to institutional investors holding large blocks of the bonds are accepted by bondholders. The corporation is one of the largest producers in Canada of newsprint, pulp and paper products. It is a reorganization of Canada Power and Paper Corporation and of its subsidiaries and includes: The Anticosti Corporation, Belgo-Canadian Paper Company, Laurentide Company, Port Alfred Pulp and Paper Corporation, St. Maurice Valley Corporation, and Wayagamack Pulp and Paper Company.

The present proposal is interest due January 2, 1937, and the succeeding five semi-annual interest payments will be paid in common stock at the rate of $11 per share. This would mean that on each semi-annual interest date for the next three years the holder of a $1,000 bond would receive 2½ shares of common stock and that earnings of the company during that period would be devoted to overcoming the present serious weakness in liquid position and the building up of a strong working capital position. It is possible that some changes may be made in this plan before final submission to bondholders.

Earnings of the company have shown substantial advance thus far in the current year. In the five months ended August 31 net earnings available for depreciation and bond interest are understood to be $1,375,000 as compared with $751,000 in the same period of 1935. In the year ended March 31, 1936, the company operated at 60 per cent of rated capacity and had an operating profit of $2,202,664 before depreciation and interest. In the current year it is estimated that the company will operate at near 75 per cent of rated capacity. Unofficial estimates place operating profits at about $4,200,000 for the current fiscal year. This is before providing depreciation which amounted to $2,269,450 in the year ended March 31, 1936, and bond interest which would total $2,827,379.

Institutional holders of the bonds are understood to approve the general idea of the plan privately submitted by the company and it is probable that a general meeting of bondholders will be held before the end of the year. Unless this is done there is immediate danger that the company will again go into default and it is generally agreed that this is undesirable.

New President for Bathurst

A. J. Nesbitt has resigned as president of the Bathurst Power and Paper Company, and is succeeded by R. L. Weldon, who has had wide and varied experience in the paper industry, and for the past nine years has been associated with the International Paper Company. Mr. Nesbitt will continue as a director of the company.

A Canadian, Mr. Weldon, the new president, graduated from McGill University, with an M.Sc. degree. He was manager of the large paper mills at Cornerbrook, Newfoundland, of the International Paper Company for a period of five years and during the past six years he has been chief engineer of the International Paper Company and subsidiaries, making his headquarters in New York. Mr. Weldon was also an officer and director of several of the subsidiary companies of International Paper Company, including the International Fibre Board Company, and the International Hydro-Electric Company of New York.

Beaupre Mill to Be Re-opened

The Ste. Anne Paper Company, Limited, now a subsidiary of Abitibi Power and Paper Company, intends to reopen its mill at Beaupre, near Quebec, next spring. The mill, which has been closed for four years, has an annual rated capacity of 78,000 tons of ground wood and sulphite pulp. Preliminary work has already been started in connection with the re-opening. According to Quebec reports a $200,000 Spillway, seven miles in length is to be erected from St. Fereol to Beaupre in order that the company can float its pulpwood down to the mill.

Analysis of Newsprint Situation

At the end of September last, the market value per daily ton for all the securities of leading Canadian newsprint producers had been carried to a total of over $20,000 per daily ton of capacity, according to an analysis of the newsprint situation prepared by R. O. Sweezey and Co. of Montreal. This figure compares with a low of $4,800 at the end of 1932. North American consumption of newsprint is still some ten per cent below the 1929-30 totals, the review further states despite record production by the Canadian industry.

Lake St. John Power and Paper Co.

Final details are now available of the plan of capital reorganization for Lake St. John Power and Paper Company. They differ only in minor details from particulars outlined in these columns some weeks ago. There is to be an exchange of securities designed to take care of the funded debt of the company and place the capital structure on a permanent basis in line with present conditions.

J. Slicklen Joins Charles F. Hubbs & Co.

Charles J. Slicklen, who is very well-known in the trade, has become assistant to Richard C. Kettles, Jr., vice-president and chairman of the executive committee of Charles F. Hubbs & Co.

Mr. Slicklen will be in charge of sales, and he brings to the long-established House of Hubbs, an experience of twelve years with the Brown Company of Portland, Maine. For the past two years, he has been manager of their New York office.

Mr. Slicklen leaves the Brown Company with the sincere regret of that organization, but with the good wishes of all his associates there, wishing him success in the distributing end of the paper business, which he has already had considerable experience contacting, and which offers wide opportunity for progressive and constructive effort, particularly with the long-established house of Charles F. Hubbs & Co.

Mr. Slicklen has served as vice-president of the Salesmen's Association of the Paper Industry, and in that capacity had close contact with various manufacturers' salesmen.

Boston Paper Business Conditions Improving

Manufacturing Operations Speeded to take Care of Heavier Demand From Paper Merchants—Request for Both Fine and Coarse Papers Well Sustained—Tissues Moving in Good Volume—Paper Stock Quotations Advance

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., October 26, 1936—The wholesale paper market here, judging from statements made by members of the trade, is in a decidedly healthy condition. The mills supplying the jobbers are also very busy, so much so that in some cases, at least, deliveries are slow. A mill, which manufactures fine and wrapping paper and several specialties is operating night and day. In fine paper there was a little more activity in some quarters. Comments included such expressions as "pretty good," "going along very well," and "very good." Similar comments in the wrapping paper trade were made. There was a very good demand for tissues.

In box board, dealers made favorable statements. Mills are slow in making deliveries, undoubtedly from the same cause that is occasioning delay in shipments of paper.

A strong market, with a rising tendency, prevailed in paper stock. Supplies are scarce, at least in many grades, so that values are enhanced. Out of nineteen price changes, each is an advance, except in one case, that of old linsey garments, under foreign rags. In this grade, the high side of the range remains at 2.37½, but the low side has declined to 2.00 from 2.12½, making a broader spread. Under old papers, mixed papers and old newspapers remained at the same levels, but No. 1 hard white shavings advanced to 2.20 @ 2.35 from 2.00 @ 2.10; No. 1 soft white shavings to 1.85 @ 2.15 and from 1.75 @ 1.85., No. 1 kraft to 1.20 from 1.15, all f. o. b. Boston. In bagging, domestic scrap burlap rose to 1.75 @ 1.80 from 1.60 @ 1.75; new burlap cuttings to 2.25 @ 2.50 from 2.00 @ 2.25; and heavy baling bagging to 2.00 @ 2.50 from 1.85 @ 2.00, all f. o. b. Boston. Six price appreciations took place in new domestic rags. New white shirt cuttings No. 1 advanced to .07½ @ .08 from .07¼ @ .07¾; new white shirt cuttings No. 2 to .04½ @ .05 from .04 @ .04¼; Silesias No. 1 to .06½ @ .06¾ from .06 @ .06¼; soft unbleached to .08 @ .08½ from .07½ @ .08; blue cheviot to .06½ @ .07 from .06¼ @ .06¾; and B. V. D. cuttings to .07¾ @ .08 from .07½, all f. o. b. Boston.

Roofing stock, under old domestic rags, advanced in all three grades listed. The No. 1 grade went up to 1.60 @ 1.70 from 1.50 @ 1.60, No. 2 to 1.45 @ 1.55 from 1.35 @ 1.45 and No. 3 to 1.35 @ 1.45 from 1.25 @ 1.30, all f. o. b. Boston. In foreign rags, dark cottons rose to 1.85 @ 2.00 from 1.70 @ 2.00, old fustians to 2.00 @ 2.10 from 1.75 @ 1.90; and new Silesias to 5.75 @ 6.00 from 5.00 @ 5.75, all f. o. b. Boston

News of the Industry

An informal luncheon meeting of the Fine Paper Division of the New England Paper Merchants Association was held at the Boston Chamber of Commerce Wednesday, with W. E. Porter, Jr., a director of the association presiding. There was a general discussion of trade conditions. Next Friday a meeting of wrapping paper merchants will be held at the Chamber of Commerce, called by the cost finding committee.

Charles A. Esty, president of Storrs & Bement Company, and Charles A. Esty, president of Carter, Rice & Co., Corp., whose firms are agents of the Hammermill Paper Company, are to attend a special meeting of all representatives of the company at Erie, Pa., October 27 and 28.

John C. Hurd, executive secretary of the New England Paper Merchants Association, was in New York the latter part of last week, conferring with executives of the National Paper Trade Association of the United States.

Knight, Allen & Clark, Inc., are pleased to announce that, as of November 2, Frederic G. Lockwood will be associated with the firm as treasurer. Mr. Lockwood entered the company with an interest that will place Knight Allen & Clark on a very good financial basis. He has not been previously associated with the paper industry, but is very much interested in some of the large insurance businesses in New England. Knight, Allen & Clark feel certain that the new arrangement will be a large factor in the paper industry of New England. The firm, as in the past, will be enabled to furnish prompt service to the trade. Announcement will be in the mail shortly.

The new arrangement includes Nath. S. Clark, president and general manager, Frederick G. Lockwood, treasurer, M. Lincoln Simpson, secretary, L. R. Mathers, vice-president and sales manager and Mary T. Dunphy who will continue to fill the position of assistant treasurer, having been connected with the firm since 1921. This comparatively young concern will be on a new set up, able to take care of all business with its mill connections in first class shape. After November 2, Mr. Lockwood will be at the office of the company as an active factor in business.

The Von-Olker Snell Paper Company has taken the agency for Kilmory Book and Cover, made by W. C. Hamilton & Sons, Inc., Miquon, Pa., and has stocked this line in the warehouse of the concern. The line is manufactured in white and seven colors, laid and wove. The Vo-Olker Snell company is distributing very handsome sample books, various sizes and weights and suggesting various color combinations for the printer.

Joseph Kinniery, for a good many years salesman for the Arnold-Roberts Company, has just resigned to take a similar position with Ireland & Taub Paper Company, Inc., covering Boston and Western Massachusetts.

Employees of the Arnold-Roberts Company gave Mr. Kinniery a party in Waltham Saturday evening, October 17, presenting him with a very handsome brief case and extending to him their best wishes.

Floyd H. Blackman, secretary of the D. F. Munroe Company, is in charge of the paper group in connection with the Salvation Army Drive for Metropolitan Boston.

To Head Empire Forest Association

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., October 27, 1936—Clarence L. Fisher of Lyons Falls, was chosen president of the Empire State Forest Products Association at the annual meeting held during the week in this city. The association is composed of timberland and mill owners who own nearly 1,000,000 acres of forest in the state. Mr. Fisher has been a director of the association for many years. Business affairs of the organization were discussed during the meeting.

Demand for Paper Expanding in Chicago

Practically All Standard Grades of Paper Display Greater Strength—Fine Paper Market Responds to Accelerated Business Tone—Bonds and Ledgers In Strong Position — Book and Cover Papers Are in Excellent Request

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., October 28, 1936.—Despite the high pitch of interest in elections and speculation as to the effects of the outcome, the Chicago paper market continued to move into higher ground during the past seven days. Strength apparent a few weeks ago has gained in momentum to cover virtually all lines and to extend into the paper stock market, where folded news, in particularly, is reported to be giving a most excellent account of itself. Sulphites are said to be strong, with an increasingly firm undertone reflecting the demand. Krafts are equally firm and are expected to continue on an even more advanced plane as demand broadens out. Ground woods are quoted as exceptionally good, with mills reporting, in some cases, an actual capacity production. While such a situation is not universal it does reflect the strength of the market. Newsprint is also in a more favored position while the board market continues to improve. Fine papers in general have responded to the accelerated business tone with bonds and ledgers strengthened and the undertone good in practically all grades. Books and covers, particularly the former, are quoted as in good demand. Waste papers, as mentioned above, continue to improve as mill production in varied grades is being speeded up.

News of the Industry

Chicago has now become the headquarters of the largest wall paper manufacturers in the world, as the United Wall Paper Factories, Inc., have chosen this city as their main headquarters. All other executive offices are reported to have been consolidated here, the consolidation effecting the plants in Jersey City; York, Pa.; Joliet and Appleton, Wis. Hadar Ortman is the president of the company, formerly with the Meredith Publishing Company. Rudolph Neuburger is the vice president and chairman of the executive committee while A. F. Kletzien will serve as controller and treasurer. Mr. Kletzien was formerly secretary and controller of the Fox River Paper Company.

J. H. Coy, Chicago vice president of the Flambeau Paper Company, will return to Chicago on October 29 after a month's combination business and vacation trip in the Eastern States. Accompanied by his wife, the well known sales executive has been visiting mills, calling on customers and finding the time to headquarter in Philadelphia where Jim, Junior, is representing the Cherry River organization.

The Midwest Division of the Salesmen's Association of the Paper Industry held its regular weekly luncheon at the Hotel Sherman on October 19 with Jack Burrus, divisional vice president, in charge. The round table discussion resolved itself into a careful study of the outcome of the meetings held in Chicago recently by the book and writing paper executives. The salesmen correlated the information received, analyzed it and adapted it to their own understanding of the reported successful outcome of the sessions.

Another of those interesting mailings from the S. D. Warren Company comes to Chicago advertising and printing desks this week. Called "The Sales Statistics Look Fine—But How's The Business," the informal article suggests that a questionnaire might be a dependable yardstick for finding out just how business is. The unique thing about the Warren mailing is the type used, the formation of the layout and the paper stock itself. This particular mailing happens to be printed on Warren's Thintext, 25 x 38-30. The Chicago Paper Company is the local outlet.

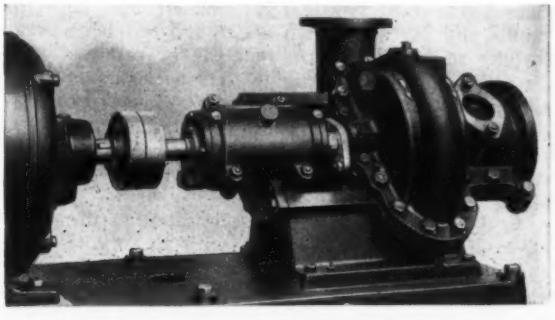
Session held in Chicago recently and sponsored by the Writing Paper and Book Paper Associations, were characterized locally as highly successful and encouraging to the future outlook of the industry. Both organizations met at the Drake Hotel and the reported successfulness of the deliberations is credited with having a genuinely beneficial psychological and practical effect on the present strong tone of the sulphite bond, book and kindred lines.

The Midland Paper Company is issuing some splendid advertising literature to the trade—now as a division of the Zellerbach Paper Company. "Put Them To Work Now," is the title of a broadside listing the names of six skilled men in design, packaging and product styling, available to Midland customers in the paper, printing and letterhead field. The Fox River Paper Company is co-sponsor of the mailing which advertises Fox River rag content bonds, the broadside itself being printed on Right-of-Way Bond, White, Substance 24.

"Are Your Letterheads Geared to the Present" is another Midland folder, bearing the photograph of Paul M. Ressinger, designer of the sample letterhead enclosed and giving an interesting discussion of the new services offered by Midland, Zellerbach and Fox River Paper Company in designing, packaging, etc.

Paper Machine Supply Pump

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has developed a specially designed paper stock pump for use in supplying stock to the paper machine head box. This pump is of the centrifugal, open impeller type with an impeller of such characteristics that there is very little change in capacity for such change in head as is encountered in this service. The manufacturer claims that quite a number of these pumps are now in satisfactory service and that the initial cost and maintenance is much less than other types of pumps formerly used for this service.



ALLIS-CHALMERS PAPER STOCK PUMP

Power Rates for Ontario Paper Mills Reduced

Substantial Decrease Approved by Ontario Hydro-Electric Commission for Pulp and Paper Industries At Fort William and Port Arthur—Will Assist Materially in Keeping Plants in Operation During Winter Season

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., October 20, 1936—The Ontario Hydro Electric Commission has approved a reduction in rates for power supplied to the pulp and paper industries at Port Arthur and Fort William. The Great Lakes Pulp and Paper Company, supplied with power by the Ontario Hydro, gets a cut from $21 to $18 per hp. The Thunder Bay Paper Company and Provincial Paper, Ltd., supplied by the Port Arthur Hydro receive a reduction from $21 to $19. Power supplied to them is transformed by the local commission from 110,000 to 22,000 volts. For the Great Lakes company, the stepping down is done by its own transformers. The decrease in rates is regarded by the pulp and paper industries as substantial and will assist materially in keeping them running during the winter months.

Pulpwood Situation

Replying to the resolutions passed by the City Council of Fort William, Ont., urging the reopening of the Abitibi paper mill at Fort William and questioning the allotment of timber contracts for the Great Lakes paper mill, the Hon. Peter Heenan, Minister of Lands and Forests for Ontario, has informed Mayor R. B. Pow, of Port Arthur, that he does not think that the government of the province could interfere in the matter of pulpwood contracts. In connection with the Abitibi mill, Mr. Heenan said that steps toward its reopening on a different product than newsprint were being undertaken.

The Hon. M. F. Hepburn, Premier of Ontario, has announced in connection with the pulp export policy of the government that no United States paper concern will be allowed to operate directly on Ontario Crown lands but must cut wood through some recognized Ontario jobber or Ontario mill concern in good standing with the province. Mr. Hepburn also made it clear that the definite cutting policy of the government is to grant yearly permits in certain areas based on continuous operation. If at the end of the year the fixed minimum of timber required under a contract to be taken out is not cut the deposit put up by the operator will be confiscated and the cutting rights made available to some other operator. Mr. Hepburn has spent many hours in negotiating further agreements between the government and jobbers. When these are consummated they, and those which have been ratified in the past, will represent to the province of Ontario this year an increase of some $900,000 in revenue for the department of lands and forests. Such a demand has been created, according to Mr. Hepburn, that the government is now finding difficulty in meeting it. As a means of making available further pulpwood the government proposes to send departmental engineers into Northern Ontario to survey and study possibilities of improving rivers and streams that are linked up with vast timber stands hitherto practically untouched.

A provincial charter has been granted to the General Timber Company, Ltd., Toronto, with an authorized capital of $100,000 to manufacture and deal in all kinds of lumber and timber, pulp, pulpwood, paper and other products. Among the provisional incorporators are Leonard G. Masson, Howard B. Sheppard and Thomas L. Savage, all of Toronto. The Office Stationery and Printing Company, Ltd., Toronto, has also been incorporated with an authorized capital of $40,000 to carry on business as publishers and buy, sell and deal in paper, paper boxes, tags, etc. Among the incorporators are S. Alter, Lewis Samuels, Harold Massey and Harry A. Stone, all of Toronto.

About 400,000 cords of pulpwood will be cut in the Thunder Bay district of Ontario during the coming winter. The operations in the bush will mean a three million dollar turnover and the employment of nearly 4,000 men. The amount of wood to be cut this year will be double that of two years ago and twice as many men will be engaged. During the summer sap peeling, which closed a few weeks ago, 100,000 cords of wood which meant a million dollars more to the district, were taken out and the outlook for next summer is promising owing to the additional contracts made.

Paper Industry Shares General Recovery

There is a persistent improvement in Canadian business and the paper industry is sharing in the recovery. Newsprint bonds continue active and production is on a large scale. Book and writing paper plants are well employed and some of the mills have orders ahead which will keep machines going for several weeks. Toilet and tissue plants have enjoyed a good season and the outlook is bright. In the rag and paper stock market quotations continue firm and the demand for new cotton cuttings is very good.

One theory which has an influence on the paper market as well as on other lines of production, is that improvement in buying power has uncovered a change in the habits of the people and that the uncertainty regarding the future value of money and the low rates of interest on bank deposits have curbed normal habits of thrift and saving, with the result that money is being spent almost as quickly as it is earned and not saved for the rainy day. Evidence of the accelerated demand is seen in sales tax returns as revealed in the first six months of the fiscal year which show a gain of thirty-four per cent in returns.

Dr. Emil Heuser Honored

Many friends are congratulating Dr. Emil Heuser of the Canadian International Paper Company, Hawkesbury, Ont. on being elected chairman of the Division of Cellulose Chemistry of the American Chemical Society. He will direct arrangements for the divisional program at the ninety-third annual meeting of the society to be held in Chapel Hill, North Carolina, next April.

New Paper Mill in Newfoundland

A dispatch from St. John's, Newfoundland, states that it has been officially announced on behalf of the government that construction of a new pulp and paper mill on the Gander river, Newfoundland, will be started in May of next year.

Four thousand miles of timber lands have been leased to the Reid Newfoundland Company who are backing the project, the announcement said. It was also announced that the International Paper Mills at Corner Brook have stepped up production to 620 tons daily.

New Power Equipment Widely Installed In the Paper and Pulp Industry

Among the equipment installed recently by the Babcock & Wilcox Company, New York, are the following:

Advance Bag & Paper Co.

The Advance Bag & Paper Co., Inc., of Howland, Maine, has installed B&W-Tomlinson Recovery Process including a Babcock & Wilcox Cross-Drum Sectional-Header Boiler, B&W Air Heater, Bailey Water-Cooled Furnace, forced and induced-draft fans, spray tower, mixing tank, black liquor pump, and Bailey metering and control equipment.

The process has a capacity equivalent to 75 tons of pulp per day. The boiler will generate 3,200 lb. of steam per hour at 150-lb pressure. It is designed for 450 lb.

Beckett Paper Co.

The Beckett Paper Company, of Hamilton, Ohio, has ordered two Babcock & Wilcox Stirling Boilers for a new plant. These boilers are designed to have a maximum capacity of 24,800 lb. of steam per hr., and are capable of being operated at 400-lb. pressure, but will be run at 125-lb. pressure. The boilers are fired by Taylor underfeed stokers bought direct from the manufacturer.

Brown Paper Mill Co., Inc.

The Brown Paper Mill Company, Inc., of West Monroe, La., purchased in November, 1935, two B&W-Tomlinson Recovery Process Units including boilers, superheaters, air heaters, Bailey Water-Cooled Furnaces, forced and induced draft fans, mixing tanks, black-liquor pumps and burners, and Bailey metering equipment. Each has a capacity of 23,600 lb. per hr. black liquor concentrated to 63 per cent solids.

Babcock & Wilcox Three-Drum Waste-Heat type Stirling Boilers form a part of the process and have a maximum steam-generating capacity of 53,000 lb. per hr. with initial pressure of 200 lb. per sq. in. and ultimate pressure of 450 lb. Steam temperature 750 deg. fahr.

Cornell Wood Products Co.

The Cornell Wood Products Company, of Cornell, Wis., recently installed one Babcock & Wilcox Integral Furnace Boiler with Bailey Water-Cooled Furnace, B&W Type B Pulverizers, pulverized-coal burner, and air heater. The unit is built for a maximum capacity of 75,000 lb. of steam per hr. and is designed for operation at 450-lb. pressure. Initial operation will be at 200-lb. with provision for later operation at 425-lb. pressure in conjunction with a turbo-generator. The unit will be required to operate at rapid load fluctuations and to carry week end loads of approximately 4,000 lb. steam per hr. To meet these requirements two pulverizers are used, one serving a standard size pulverized-coal burner, and the other serving a standard and low-load burner, the latter to operate the boiler with an output ranging from 4,000 lb. to 22,000 lb. of steam.

Crown Willamette Co.

Crown Willamette Paper Company, of Camas, Wash., has purchased one B&W-Tomlinson Recovery Process including Three-Drum Waste Heat type Stirling boiler, Bailey Water-Cooled Furnace, air heater, spray tower, forced and induced-draft fans, black liquor pump, and Bailey meters.

The process has a capacity equivalent to 150 tons of pulp per day. The boiler will be designed for an ultimate capacity of 55,900 lb. of steam per hour at 375-lb. pressure. This process was purchased to replace existing equipment, part of which is being retained for standby service.

Hammermill Paper Co.

The Hammermill Paper Company, of Erie, Pa., ordered the latter part of last year two Babcock & Wilcox Integral Furnace Boilers with Bailey Water-Cooled Furnaces, B&W coal-pulverizing and burning equipment. Each boiler has a maximum capacity of 80,000 lb. of steam per hr. at 675 lb. pressure and will deliver steam at 775 deg. fahr. The burners will be combination type suitable for lighting low-load operation with oil fuel.

National Paper Products Co.

The National Paper Products Company, of Port Townsend, Wash., has ordered one B&W-Tomlinson Recovery Process including Babcock & Wilcox Cross-Drum Sectional-Header Boiler complete with Bailey Water-Cooled Furnace, spray tower, forced and induced-draft fans and Bailey meters. The boiler is capable of delivering 24,200 lb. of steam per hr. at 375-lb. pressure.

The process has a capacity equivalent to 75 tons of pulp per day.

Newton Falls Paper Co.

Newton Falls Paper Company, of Newton Falls, N. Y., purchased early this year one Babcock & Wilcox Integral Furnace Boiler with Bailey Water-Cooled Furnace, B&W Pulverized-Coal Equipment and Air Heater. Capacity of the unit will be 55,000 lb. of steam per hr.

Normal load will be about 35,000 lb. of steam in summer and 45,000 lb. in winter. Although the primary fuel will be pulverized coal, the burners are of combination type to permit oil firing for starting purpose and in emergency when electric power for the coal-firing equipment is not available. Coal will be used with an ash-fusion temperature of 2300 deg. fahr. Operating pressure will be 135 lb.

This unit will take the place of two stoker-fired Stirling boilers which will be used for standby purposes. It is estimated that the new unit will pay for itself in 2½ years because of reduced maintenance, increased efficiency, and the use of lower priced coal.

Riegel Paper Co.

The Riegel Paper Company, of Warren, N. J., has purchased one Babcock & Wilcox Stirling Boiler with Bailey Water-Cooled Furnace. This boiler is to have a maximum capacity of 75,000 lb. steam per hr., and 400-lb. operating pressure.

St. Regis Kraft Co.

The St. Regis Kraft's Company of Tacoma, Wash., has bough one Babcock & Wilcox Stirling boiler complete with superheater, air heater and Bailey Water-Cooled Furnace. The boiler is designed for a maximum capacity of 69,000 lb. steam per hour at 250-lb. pressure, and will operate at 135-lb. pressure with 465 deg. F. steam temperature.

Union Bag & Paper Co.

The Union Bag and Paper Corporation has brought two Babcock & Wilcox Stirling Boilers with water-cooled furnaces, superheaters, and air heaters for its new mill at Savannah, Ga. Each boiler is being built for maximum capacity of 75,000 lb. of steam per hr., and will operate at 430-lb. pressure with 750 deg. fahr. steam temperature.

The latter part of last year three Babcock & Wilcox Oil-Fired Stirling Boilers with superheaters and air heaters were ordered. Two of these units have extension furnaces for burning bark. Each has a capacity of 43,750 lb. of steam per hr. with oil firing and will operate at 430-lb. pressure and will deliver steam at 735 deg. fahr.

West Virginia Pulp & Paper Co.

The West Virginia Pulp and Paper Company recently ordered a Babcock & Wilcox Integral Furnace Boiler complete with Bailey Water-Cooled Furnace, superheater, and air heater for their new plant at Charleston, S. C. The unit will be equipped with a Hofft wood-burning furnace. It is designed for a maximum capacity of 48,000 lb. of steam per hour at 600-lb. pressure and 700 deg. fahr.

Roy A. Kropp Named as President

The Kropp Forge Company, established in 1901 and since then headed by Chas. A. Kropp, has recently announced the resignation of Chas. A. Kropp as president, and the election of Roy A. Kropp to succeed him. Chas. A. Kropp will continue his active connection with the company in the capacity of chairman of the Board of Directors.

In succeeding to the active management of the Kropp Forge Company, Roy Kropp represents the third generation of the Kropp family to follow the forging business, his grandfather having operated a small nail forging plant at Annefors, Sweden, as early as 1837. From that humble beginning, the present company has grown to where its physical facilities and highly efficient workmen can make drop forgings of any shape or grade of steel, in a size range from one-half ounce to seven hundred pounds in weight, and hammered forgings to thirty tons.

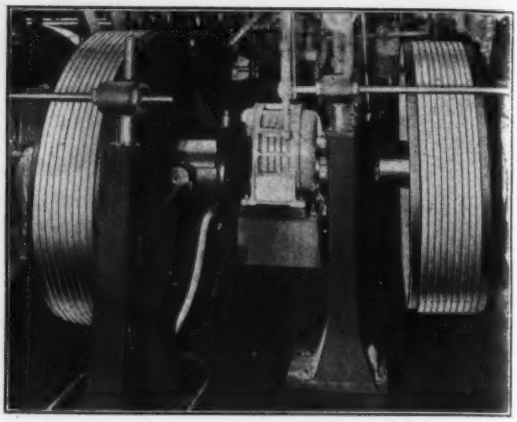
Roy Kropp's entire business career has been devoted to the modernization of production methods for drop and hammer forgings.

The Kropp Forge Company plant consists of three large buildings covering ten and one-half acres of land. Facilities are complete for making drop forgings, hammer forgings, heat treating and machining forgings of any shape or size. Ten modern drop hammers, from 1,000 to 10,000 pounds capacity, each complete with trimming press and furnaces, highly skilled production men, and unlimited raw material stocks provide forging facilities unequalled in the Middle West.

Both chemical and physical laboratories are maintained to test all forgings while in process of manufacture so that Kropp forgings meet all that is implied by the company's slogan, "forgings to your specifications."

Economy of Gates V-Flat Drive

Franklin Board and Paper Company were driving their plant from a main line shaft through various counter shafts. When the question of modernization came up, S. F. Whitesel, assistant general manager, favored the idea of providing the motors for driving the beaters with grooved sheaves—and using Gates Vulco Ropes to operate from these sheaves to the same flat pulleys on the beaters that the flat belts had been operating upon.



TWO OF GATES VULCO ROPE BEATER DRIVES.

Using the flat pulleys in this way, six V-Bent Drives were applied at a cost of only $1,774.32, as against a cost of $3,314.95 if both pulleys on the drives had been grooved—a saving of $1,540.63 for the Gates Vulco V-Flat Drives.

Discussing the change-over to Gates Vulco Rope Drives, Mr. Whitesel declares:

"The entire installation has been more satisfactory than anticipated, particularly in the case of loose side tension in the belts . . . resulting in lower total belt tension and longer belt life.

"Another pleasant surprise arose in the case of misalignment on one drive—resulting in the belt's riding to the very edge of one of the original flat pulleys used, and staying there.

"Within a short time, another beater will be installed and you can be assured that it will be driven by another Gates V-Flat Drive."

New Link-Belt Stoker Publication

Recently off the press is a new 28-page book, No. 1619 on Link-Belt automatic coal stokers for industrial and commercial use in capacities up to 300 hp. The book is copiously illustrated, reproduces numerous letters from users, and gives much pertinent data.

Among the major headings are these: scientific combustion cycle; burning heads "tailored" to fit the coal available; variable intermittent drive that insures an agitated fuel bed; automatic air control; stoker hoppers designed in the Link-Belt tradition; analysis of stoker efficiency test on an industrial application; a self-liquidating investment, paying returns as high as 100 per cent, plus improved boiler operation.

A copy of the new book will be sent to any interested reader upon request addressed to Link-Belt Company, 2410 W. 18th street, Chicago, Ill.

New Type Cylinder Mould

The Sinclair Company, of Holyoke, Mass., announces the New Sinclair Shurlock Deep Groove Winding Wire Cylinder Mould, which is claimed to be a tremendous advance in cylinder mould construction.

Special features of this new mould are: Deeper winding wire; winding wires permanently locked—they can't come loose; rods dovetail to fit all spiders; great strength in spiders and rods; nickle-iron hollow shaft, press roll construction; hammered steel bearings; wireless weld back wires and wireless weld face wires.

With the exception of the shaft and bearings the new speed mould is made of phosphor bronze throughout.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Niagara Falls, N. Y.—The Kimberly-Clark Corporation, Packard road, manufacturer of book and other paper stocks, has approved plans for new addition to local mill, to be five-story, estimated to cost close to $300,000, with equipment. General contract has been awarded to Wright & Kremers, Inc., Pine avenue and Main street, Niagara Falls, and superstructure will begin at early date. Main offices of company are at Neenah, Wis.

Huntington, W. Va.—The Owens-Illinois Glass Company, Ohio Building, Toledo, Ohio, is said to have plans under way for new one-story addition to corrugated paper box-manufacturing plant at Huntington, for large increase in present capacity. Output is used by company for shipment of glass bottles and other glassware. A tract of 13 acres of land in vicinity of Seventh street and Washington boulevard has been acquired, and portion of property will be used for proposed expansion. Cost reported over $50,000, with equipment.

Laurel, Miss.—The Masonite Corporation, manufacturer of insulating board and kindred products, has steel frame superstructure under way for new addition to local mill, recently referred to in these columns. It will be 72 x 239 feet, and 40 feet in height for greater part of length, with first floor about 14 feet above ground level. New unit will be used for production of plastic fiber board, as well as a new product of allied character recently perfected by the company. Installation will include a 78-inch Fourdrinier machine and complete auxiliary equipment. Entire project will cost in excess of $150,000, with machinery.

Chicago, Ill.—The Union Bag and Paper Corporation, 3737 South Ashland road, manufacturer of paper bags and containers, has plans for new two-story addition to local plant, for which superstructure will begin at early date. No estimate of cost has been announced. Main offices of company are in the Woolworth Building, New York.

Brunswick, Ga.—The Brunswick Pulp and Paper Company, recently organized with capital of $1,000,000, by officials of Mead Corporation, Chillicothe, Ohio, has engaged George F. Hardy, 305 Broadway, New York, N. Y., consulting engineer, to prepare plans for proposed new sulphate pulp mill on 40-acre tract of land at Brunswick, lately referred to in these columns. It will comprise several large operating units, equipped for initial output of 150 tons per day, with ultimate investment estimated at close to $7,000,000. It is proposed to begin work at early date. Charles R. Van de Carr, vice-president of Mead Corportion, is president of Brunswick company.

Los Angeles, Cal.—The Pacific Coast Envelope Company, Wilcox Building, manufacturer of commercial envelopes and allied paper products, has plans under way for new paper-converting plant on tract of land on East 12th street, recently acquired, totaling about 40,000 square feet of ground area. It will be two or three-story, exact height now being determined, and will cost close to $100,000, with equipment. Plans are being prepared by the Austin Company, 777 East Washington blvd., Los Angeles, engineer and contractor, which will also be in charge of erection.

Middletown, Ohio—The Gardner-Richardson Company, Middletown, manufacturer of box board, chip board and kindred paper board products, has approved plans for new addition to plant on site on Charles street, near Fleming street, to be one-story, 102 x 267 feet, designed primarily for storage and distributing service. General erection contract has been let to Steen G. Sorenson, 27 Walnut street, Wyoming, Ohio, and for structural steel framing to William Lang & Sons Company, 3280 Beekman street, Cincinnati, Ohio. Superstructure will be placed under way at once. New unit will cost close to $60,000, including equipment.

Emeryville, Cal.—The Paraffine Companies, Inc., manufacturer of building papers and kindred paper products, is awarding miscellaneous contracts for new addition to local mill, recently referred to in these columns, including structural steel framing to the Moore Dry Dock Company, foot of Adeline street, Oakland, Cal., and reinforcing steel to Bethlehem Steel Company, Twentieth and Illinois streets, San Francisco, Cal. Work is being placed under way. New unit will be one-story, reported to cost about $50,000, with equipment. Barrett & Hilp, 918 Harrison street, San Francisco, are general contractors. Leland Rosener, 233 Sansome street, San Francisco, is engineer.

Cleveland, Ohio—Van Luit & Kemper, Inc., manufacturers of coated wall paper stocks, have removed plant from 2906 Euclid avenue to 9205 Detroit avenue, N.W., where company recently leased about 15,000 square feet of floor space in former factory of the Ohio Body Company, manufacturer of automobile bodies. Expansion in manufacture will be carried out at new location, where additional equipment will be provided.

Adams, Mass.—The L. L. Brown Paper Company, manufacturer of bond and other fine paper stocks, has plans nearing completion for new addition to mill, including improvements in present plant. Building award is scheduled to be made at early date. No estimate of cost has been announced. McClintock & Craig, 458 Bridge street, Springfield, Mass., are architects and engineers.

Windsor, Conn.—The Stevens Paper Mills, Inc., has been chartered under state laws with capital of $21,025, to succeed to company of same name with local paper mill, specializing in production of insulating paper and board, and kindred paper stocks.

Plymouth, Mich.—The Burroughs Adding Machine Company, 6071 Second boulevard, Detroit, Mich., has engaged Albert Kahn, Inc., New Center Building, Detroit, architect and engineer, to prepare plans for proposed new plant on large tract of land at Plymouth. New plant will

include a division for the production of roll paper and other commercial paper products used in connection with company tabulating machines and office equipment. The paper-converting department will be equipped for large capacity. Bids for plant will be asked in near future. Entire project is reported to cost over $250,000, including equipment.

New Companies

Wilmington, Del.—Parchment Products Corporation, care of Mildred Geisbert, Wilmington, representative, has been chartered under Delaware laws with capital of $150,000, to manufacture and deal in fine paper stocks.

Boston, Mass.—The W. P. Soule Manufacturing Company has been incorporated with capital of $25,000, to manufacture fiber products. Clarence H. Smith is president; Katherine A. Pugh, Arborway court, Boston, is treasurer and representative.

New York, N. Y.—The Square Deal Paper and Twine Company has been incorporated with capital of 100 shares of stocks, no par value, to deal in wrapping papers and kindred products. New company is represented by Martin H. Young, 36 West Forty-fourth street, New York, attorney.

"Handbook of White Pigments"

A "Handbook of White Pigments," prepared by the Krebs Pigment and Color Corporation to make available to pigment users a convenient book of reference, is ready for distribution. It describes each of the company's white pigments briefly, indicating its field of use, consistency, physical and chemical characteristics and other pertinent information.

The handbook describes pigments under three headings: Lithopone (zinc sulphide pigments); pure titanium dioxide; and extended titanium pigments. It also contains tables of bulking values of white pigments, a tabular summary of consistency range, special properties and principal uses of white pigments and conversion tables giving comparison of metric and customary units.

Thilmany Spends $250,000

The Thilmany Pulp and Paper Company, Kaukauna, Wis., is carrying out a program of improvements involving new equipment, which it is estimated will cost $250,000. At mill No. 2 an extension to the beater and wet machine rooms has been provided. This is a two story structure, approximately 150x75 feet of reinforced concrete, brick and steel. It will house five Vortex beaters of the new design (Fig. 1) and supply the beating for Number 8 machine up to 60 tons per day.

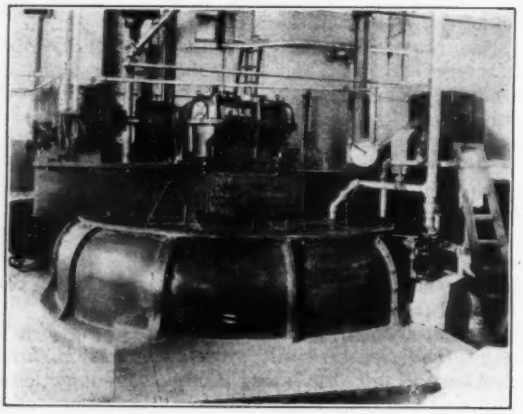


FIG. 1.

FIG. 2.

Number 8 machine has been equipped with a Valley-Voith high speed inlet, additional screens, new shake and extra driers to increase its capacity.

Number 6 machine (Fig. 2) is being equipped with a dual press of the new Beloit design which is expected to materially increase its capacity as well as show considerable felt economy. A new adka filter has been installed on this machine that reduces the fiber loss to 3/100 pounds per 1,000 gals., the first of its kind to be used in the U. S. A. A new high speed sheeter and layboy is being erected with Maxime overlapping device and two new Cameron high speed rewinders have been put in use.

In the pulp mill the multiple effect evaporators have been doubled in capacity and two new large tumbling digesters from the Blaw-Knox Company will be delivered in October.

New Williams Gauge Products

New products of special interest to the paper mill operator are announced by the Williams Gauge Company, of Pittsburgh, Pa.

The Lock Ring Seal is designed for hot and cold water, oil and liquids, also for freon, ammonia and other refrigerant gases, when rotary compressors or centrifugal pumps are used. It embodies the durability of metallic packing and the flexibility of soft packing, combining the best features of both. It consists of a series of non-friction metal rings, laminated asbestos cushion rings and a split oil or water lantern where lubrication is provided for. This item is finding a wide application in the industrial field as a packing for various mixers, compressors, centrifugal pumps, handling circulating water, brine, ice water and a number of chemicals. Sizes range from ½ inch to 6 inch shaft diameter.

The Hager Noistless Check Valve is a product which fits in with the modern trend of engineering design which requires the banishment of needless noise. It is claimed to be the first real progress in check valve design since the swing check valve was invented and embodies six important features to meet modern operating conditions: Silent—durable—compact—simple—accessible—renewable working parts.

While the noiseless feature is outstanding in all services, its durability in boiler feed lines, air compressor lines and in all kinds of pumping service has earned for it a name among the largest power plants in America as the most dependable check valve for any service—any pressure—any temperature.

Scott Paper Co. Joins With the Mead Corp. in Developing Pulp Plant at Brunswick, Ga.

At a recent directors' meeting of the newly organized Brunswick Pulp and Paper Company the permanent personnel of the directorate were elected and new officers appointed. They include members of the Mead and Scott organizations as well as well known local men, as follows:

George H. Mead, chairman of the board.
C. R. Van de Carr, Jr., president.
E. S. Wagner, vice-president and treasurer.
A. W. Macbeth, vice-president.
J. L. Ober, vice-president and manager.
W. R. Scott, 3rd, secretary.
W. M. Carney, assistant secretary-treasurer.

Directors—Thomas B. McCabe, E. S. Wagner, J. L. Ober, R. C. Mateer, James d'A. Clark, Geo. H. Mead, Sydney Ferguson, C. R. Van de Carr, Jr., H. N. Coffin, A. W. Macbeth, Millard Reese.

Scott Paper Co. Founded in 1879

Scott Paper Company was founded in 1879 by E. I. Scott and his brother. Neither of them had anything in this world but old American determination and the ability to build a business founded on service. From a little store at 27 North Sixth street, Philadelphia, the business grew in a few years until a general jobbing paper business was conducted on Commerce street, Philadelphia. Finally a converting paper plant was established at Seventh street and Glenwood Avenue, Philadelphia, and in 1910 the company built a small paper mill at Chester, Pa. Scott Paper Company is now the largest manufacturer of toilet tissues and tissue towels in the world.

Annual Gross Sales

The gross annual sales of this company were:

Year	
1916	$1,382,055.75
1921	2,604,322.14
1925	3,980,000.00
1928	6,855,000.00
1929	7,895,790.65
1930	8,642,554.78
1931	9,092,173.08
1932	8,211,608.77
1933	7,825,822.73
1934	9,065,866.45
1935	10,228,100.66

For 1936, sales are expected to exceed $11,500,000.00 and with more productive capacity, increased advertising and a seasoned sales force, a still greater volume is anticipated in 1937.

At the present time Scott Paper Company has a sales organization of approximately 170 salesmen in domestic markets. Merchandise is sold in about 54 foreign countries and they are represented by 48 agents in these countries.

Products Made and Sold

They manufacture and sell the following products:

1. Retail Brands (for home use)
   Waldorf Toilet Tissue
   ScotTissue Toilet Tissue
   ScotTowels for Kitchen Use
2. Consuming Brands (for the large consumer)
   ScotTissue Folded Towels
   Waldorf Folded Towels
   ScotTissue Service Roll (Toilet Tissue)
   ScotTissue Roll Towels

At the present writing, 1936, they are making and selling at the rate of one hundred and ninety-six million rolls of toilet tissues annually, in addition to a large volume of tissue towels. The company employs nine hundred people in its organization. It has an enviable record of having had no lay-off for lack of orders since 1921. Its total output of finished products is manufactured in its only paper manufacturing plant at Chester, Pa.

The company is listed among the first fifty national magazine advertisers in the United States. Every person, regardless of age, sex, or color, is a potential customer, and every fifth home in the domestic market is an actual user of ScotTissue Products.

Arthur Hoyt Scott an Able Leader

Arthur Hoyt Scott, son of the founder of the business, was president of the company at the time of his death in 1927. He was an able leader with whom men found it an exceeding privilege to work and associate. The principles he established are deep rooted in the activities of the present organization. Mr. Scott early in his career recognized that the first cardinal principle of building a business was the building of men. He had the rare ability to surround himself with capable young men who merited his implicit confidence and who had implicit confidence in him and the things he was trying to do.

No greater tribute could be paid to the life of this interesting individual than when at his death two of these young men stepped forward to assume financial control of the business and the responsibility for its management. One of these men was the manager of distribution, Thomas B. McCabe, and the other was Edward S. Wagner, treasurer and head of the manufacturing department. Mr. McCabe was elected president and Mr. Wagner first vice-president, continuing also in the office of treasurer.

Company's Paper Plant at Chester, Pa.

The company's only paper manufacturing plant is at Chester, Pa., Delaware County, on the Delaware River. The location offers the unique advantage of transportation by both water and rail. The Reading and Pennsylvania Railroads have sidings at the plant.

In 1910 this mill was started with two small machines manufacturing ScotTissue Products. Since that time, ten additional machines have been built. Six out of this total of twelve have since passed into obsolescence, leaving the plant with six of the most modern and finest paper machines in the world. Since 1921 productive capacity has been taxed to the limit. In addition to the paper mill at Chester the company owns a pulp mill at Charleston, Nova Scotia for the manufacture of a special mechanical fiber. This was established primarily for the purpose of quality control in the process of making mechanical fiber for ScotTissue Products. The subsidiary is known as the Nova Scotia Wood Pulp and Paper Company. With it the com-

pany purchased 20,000 acres of pulp wood and has water power sufficient to develop 15,000 additional Hydro Electric Horsepower.

The situation of the Chester plant enables the company to secure the finest grades of pulps at low cost in transportation, and affords admirable facilities for the export of its finished products.

To Stabilize Paper Trade

Premier Duplessis has announced that representatives of the Quebec and Ontario governments, with representatives of the paper industry and labor unions meet shortly to discuss stabilization of the pulp and paper market. The Quebec government, said the Premier, planned to examine the structure of the industry and intended to take steps to assure capital of only a reasonable return on its investment and to guarantee workmen, whether they be employed in the mill or in the forest, adequate wages and comfortable living conditions.

The paper industry, he continued, must not be made a matter of politics, but his Government planned legislation which would assure the industry of its liberty and at the same time guarantee the workers equitable rights.

The Premier pledged the paper industry government support so long as the industry was willing to co-operate with the Government to give Quebeckers preference. "There is no reason why Quebec's natural resources should be developed by outsiders," he added.

The Premier issued a warning note to pulp and paper manufacturers that "if they do not fall in line with the Government policies, the Government will take steps to make them fall in line."

He also stressed the need for co-operation between capital and labor and between French and English Canadians. "Equilibrium shall and will be established," he asserted.

Chris H. Phipps Dead

Chris H. Phipps, general paper sales manager of the St. Regis Paper Company, of New York, N. Y., passed away at the Columbus Memorial Hospital, Chicago, Ill., on Saturday, October 17, 1936. Services were held at the Graceland Cemetery Chapel in Chicago, on Monday, October 19.

Mr. Phipps was 55 years of age. He is survived by a wife and two daughters.

While on a business trip to Chicago, Mr. Phipps was seriously scalded in an accident which occurred on October 15. Pneumonia immediately set in and proved fatal.

Mr. Phipps was well known in the paper industry and had a very wide circle of friends. Before joining the St. Regis Paper Company in 1934, he was for a number of years sales manager of the Watab Paper Mills, of Sartell, Minn. Previous to that he was associated with The Bradner Smith Company of Chicago.

Sonoco to Start Garwood Mill in February

The Sonoco Products Company, with main offices at Hartsville, S. C., is planning to put its new mill at Garwood, N. J. into operation sometime in February, 1937. The mill will be equipped with a six-cylinder paper machine with a 102-inch trim. There will be 57 driers and it is expected to begin operation with a production of forty to fifty tons per day. The new mill will be equipped to manufacture a great many different types of board such as chip, news, press liner and some specialty board.

E. W. Sligh, formerly with the Sonoco Products Company, then with the Champion Fibre Company and until recently with the Beveridge Paper Company, will be superintendent of the new mill.

Scott Paper Net Profit Up

For the nine months ended September 27 Scott Paper Company reports net profit of $756,442, after depreciation, Federal and state income taxes, etc., equivalent, after preferred dividend requirements, to $2.49 a share on 284,978 shares of no-par common stock. This compares with net of $700,511, or $3.52 on 168,874 common shares in the 1935 period, ended September 29.

Indicated net profit for the quarter ended September 30, based on a comparison of reports for the six months' and nine months' periods, was $284,703, after the above deductions, equivalent to $1 a share on 284,978 common shares. In the previous quarter net profit was $237,139, or 76 cents on 284,951 shares, and in the September quarter of 1935 net profit was $279,890, or $1.45 a share on 168,874 common shares.

Sales for the first nine months of this year rose to $8,651,268 from $7,590,812 in the 1935 period, while operating profit rose to $1,065,401 from $895,007 in the first nine months last year.

The income account for nine months ended September 27, compared with the nine months ended September 29, 1935, follows:

	1936	1935
Net sales	$8,651,268	$7,590,812
Manufacturing and maintenance	4,784,057	4,204,263
Costs and expenses	2,358,356	2,069,869
Depreciation	443,454	421,673
Operating profit	$1,065,401	$895,007
Federal income taxes, etc.	183,247	128,037
Pennsylvania income tax, etc.	125,712	66,459
Net profit	$756,442	$700,511
Preferred dividends	46,703	104,794
Common dividends	384,675	223,755
Surplus	$325,064	$371,962

Total current assets at September 27 amounted to $3,215,424, compared with $3,424,070 on September 29, 1935. Total current liabilities this year were $815,780, against $692,573.

New Reeves Pulley Catalog

The new Reeves Vari-Speed Motodrive is described and illustrated in a catalog just issued by the Reeves Pulley Company, of Columbus, Ohio.

The Vari-Speed Motodrive combines in one compact, self-contained enclosure, a constant speed motor, a Reeves Variable Speed Control mechanism and speed reduction gears were required.

It embodies features of both the Transmission and Vari-Speed Motor Pulley. Any make of standard foot type motor may be used. This attractive drive is available in horizontal and vertical designs, capacities from ¼ to 10 horsepower; speed variation 2:1 to 6:1.

This Motodrive may be used on many different machines in the paper and paper products industries that do not require power greater than its 10 hp. maximum capacity. Among these are cutters, coaters, governors, filters, metering systems, bag machines, feed rolls, printing presses, etc.

To Sell Drainage Control Apparatus

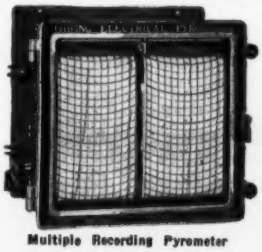
Announcement is made that method and apparatus patents of Brown Company, No. 1,653,125 dealing with Automatic Freeness Drainage Control is now open to the paper industry. Arrangements have been completed whereby Paper and Industrial Appliances, Inc. of New York with cooperation of Lewellen Manufacturing Company of Columbus, Ind. will manufacture and sell equipment under license of the Brown Company.

THWING INSTRUMENTS

PAPER TESTING AND PYROMETERS

Thwing Paper Testing Instruments give the definite technical information and provide the basis for establishing standards of quality for the paper industry. In addition to the instruments illustrated we manufacture: Multiple Folding Endurance Testers, Initial Tear Testers, Differential Scales, Softness and Stiffness Testers, White Water Samplers, Portable pH Meters, The Penescope, The Vapometer, Stretch Testers, Pulp Classifiers, etc. All of these instruments are carefully calibrated to conform to the standards set by the Technical Association of the Pulp and Paper Industry.

Thwing Pyrometers are used extensively in paper mills for indicating and recording temperatures of flue gases, front end firing zone and exit gases of rotary lime kilns, surface temperatures on revolving dryer rolls, and press platens, etc. Recording Pyrometers are supplied in single and multiple record types. Indicating pyrometers are supplied individually for each single heat source, or unit construction type, combining the pyrometer and rotary selector switch in a single metal casing. Each pyrometer is calibrated to suit its particular application.

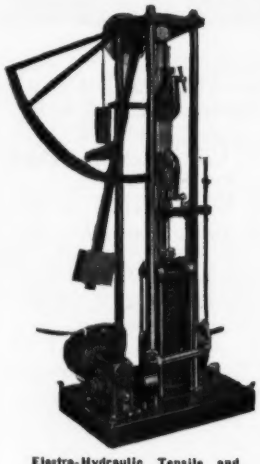


Multiple Recording Pyrometer

Indicating Pyrometer with Selector Switch

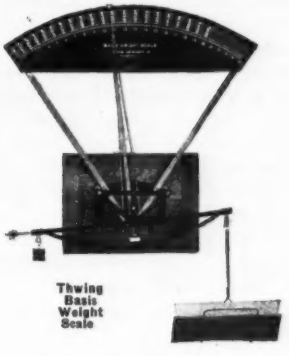
Radiation Pyrometer for Rotary Kiln Temperatures

Surface Temperature Pyrometer



Electro-Hydraulic Tensile and Elongation Tester

Elmendorf Tearing Tester



Thwing Basis Weight Scale

THWING-ALBERT INSTRUMENT CO.

3341 LANCASTER AVENUE, PHILADELPHIA, U. S. A.

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IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING OCTOBER 24, 1936

CIGARETTE PAPER

Champagne Paper Corp., *Collamer,* St. Nazaire, 150 cs.; H. H. Strauss, *Collamer,* Bordeaux, 529 cs.; Champagne Paper Corp., *Lafayette,* Havre, 573 cs.; Standard Products Corp., *Pr. Roosevelt,* Havre, 26 cs.

WALL PAPER

Rohner Gehrig & Co., *Stavangerfjord,* Oslo, 17 bxs.

NEWSPRINT

Gilman Paper Co., *Kolsnaren,* Norrkoping, 836 rolls; Brooklyn Times, *Kolsnaren,* Norrkoping, 331 rolls; Jay Madden Corp., *Kolsnaren,* Kotka, 297 rolls; N. Y. Times, *Markland,* Liverpool, N. S., 330 rolls; N. Y. Tribune, *Markland,* Liverpool, N. S., 1,816 rolls; World Telegram, *Markland,* Liverpool, N. S., 764 rolls; Brooklyn Daily Eagle, *Markland,* Liverpool, N. S., 785 rolls; Westchester Newspapers, Inc., *Markland,* Liverpool, N. S., 46 rolls; Parsons & Whittemore, Inc., *Markland,* Liverpool, N. S., 345 rolls; ———, *Humberarm,* Cornerbrook, 5,502 rolls; N. Y. Post, *Tureby,* Port Alfred, 342 rolls; Gilman Paper Co., *Tureby,* Port Alfred, 606 rolls; ———, *Stavangerfjord,* Skien, 236 rolls; Jay Madden Corp., *Pr. Roosevelt,* Hamburg, 132 rolls.

PRINTING PAPER

Dingelstedt & Co., *Bremen,* Bremen, 5 cs.; E. Dietzgen & Co., *Hansa,* Hamburg, 50 cs.

WRAPPING PAPER

E. Dietzgen & Co., *Hansa,* Hamburg, 69 cs.; Steiner Paper Corp., *Hansa,* Hamburg, 62 cs.; ———, *Hansa,* Hamburg, 10 cs.; ———, *Pr. Roosevelt,* Hamburg, 645 rolls.

FILTER PAPER

H. Reeve Angel & Co. Inc., *American Banker,* London, 9 cs.

DRAWING PAPER

H. Reeve Angel & Co. Inc., *American Banker,* London, 6 cs.

BARYTA COATED PAPER

Globe Shipping Co., *Bremen,* Bremen, 20 crates.

METAL COATED PAPER

K. Pauli Co., *Hansa,* Hamburg, 42 cs.

SURFACE COATED PAPER

Globe Shipping Co., *Hansa,* Hamburg, 1 ble.

BASIC PAPER

Globe Shipping Co., *Hansa,* Hamburg, 25 cs.

MARBLE PAPER

———, *Konigstein,* Antwerp, 5 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *American Importer,* Liverpool, 2 cs. (duplex).

DECALCOMANIAS

Sellers Transportation Co., *Hansa,* Hamburg, 26 cs.

TISSUE PAPER

B. F. Drakenfeld & Co., *American Importer,* Liverpool, 3 cs.; ———, *Rex,* Genoa, 6 cs.

COLORED PAPER

D. C. Andrews & Co., *Bremen,* Bremen, 4 cs.

PATTERN PAPER

Japan Paper Co., *American Banker,* London, 1 cs.

CARD BOARDS

Massce & Co., *Pr. Roosevelt,* Havre, 2 cs.

PAPER TUBES

———, *Bremen,* Bremen, 20 cs.; ———, *Hansa,* Hamburg, 81 pkgs.

MISCELLANEOUS PAPER

Walker Goulard Plehn Co., *Statendam,* Rotterdam, 15 bls.; Van Oppen & Co., *Pr. Monroe,* Genoa, 24 cs.; Nestle Products, Inc., *Laconia,* Liverpool, 4 bls.; F. L. Kramer & Co., *Lafayette,* Havre, 3 cs.; Corn Exchange Bank Trust Co., *Hokuroku Maru,* Kobe, 31 cs.; National City Bank, *Hokuroku Maru,* Yokohama, 12 cs.; Keuffel & Esser Co., *Hansa,* Hamburg, 84 cs.; C. Bloom, Inc., *Pr. Roosevelt,* Havre, 1 cs.

RAGS, BAGGINGS, ETC.

Irving Trust Co., *Transylvania,* Glasgow, 84 bls. paper stock; ———, *Black Heron,* Rotterdam, 45 bls. rags; Irving Trust Co., *Black Heron,* Rotterdam, 51 bls. bagging; Banco Coml. Italiane Trust Co., *E. Francqui,* Antwerp, 68 bls. flax waste; ———, *American Importer,* Manchester, 56 bls. old twines; E. Butterworth & Co. Inc., *American Importer,* Manchester, 53 bls. old twines; Chase National Bank, *American Importer,* Manchester, 186 bls. bagging; Royal Manfg. Co., *American Importer,* Manchester, 63 bls. cotton waste; ———, *American Importer,* Manchester, 132 bls. rags; M. Snedeker Corp., *American Importer,* Belfast, 167 bls. paper stock; Castle & Overton, Inc., *Waukegan,* Dundee, 167 bls. paper stock; Continental Bank Trust Co., *Waukegan,* Dundee, 63 bls. paper stock; Darmstadt Scott & Courtney, *Waukegan,* Dundee, 16 bls. paper stock; ———, *Waukegan,* Dundee, 447 bls. paper stock; ———, *Pr. Monroe,* Bombay, 205 bls. cotton waste; R. Blank, *Collamer,* Havre, 68 bls. rags; R. J. Ross & Co. Inc., *Collamer,* Havre, 217 bls. rags; W. Steck & Co., *Collamer,* Havre, 109 bls. rags; Castle & Overton, Inc., *Collamer,* Havre, 54 bls. rags; R. Blank, *Collamer,* St. Nazaire, 69 bls. rags; W. Steck & Co., *Collamer,* St. Nazaire, 33 bls. rags; E. J. Keller Co. Inc., *Collamer,* ———, 84 bls. rags; ———, *Laconia,* Liverpool, 7 bls. rags; W. Steck & Co., *Sydfold,* Hamburg, 105 bls. rags; W. Steck & Co., *Black Hawk,* Antwerp, 118 bls. flax waste; Royal Manfg. Co., *Black Hawk,* Antwerp, 70 bls. cotton waste; Irving Trust Co., *Black Hawk,* Antwerp, 64 bls. bagging; Boger Cotton Products Co., *Black Hawk,* Antwerp, 33 bls. cotton waste; G. W. Millar & Co. Inc., *Black Hawk,* Antwerp, 90 bls. rags; Di Benedetto, Inc., *Black Hawk,* Antwerp, 220 bls. old garments; E. J. Keller

The Name

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has been on

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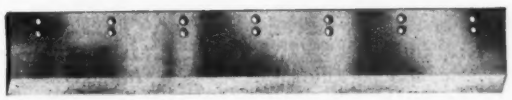
for the past

106 Years

Specializing on all types of

Paper Blades



MICRO GROUND

Loring Coes Company

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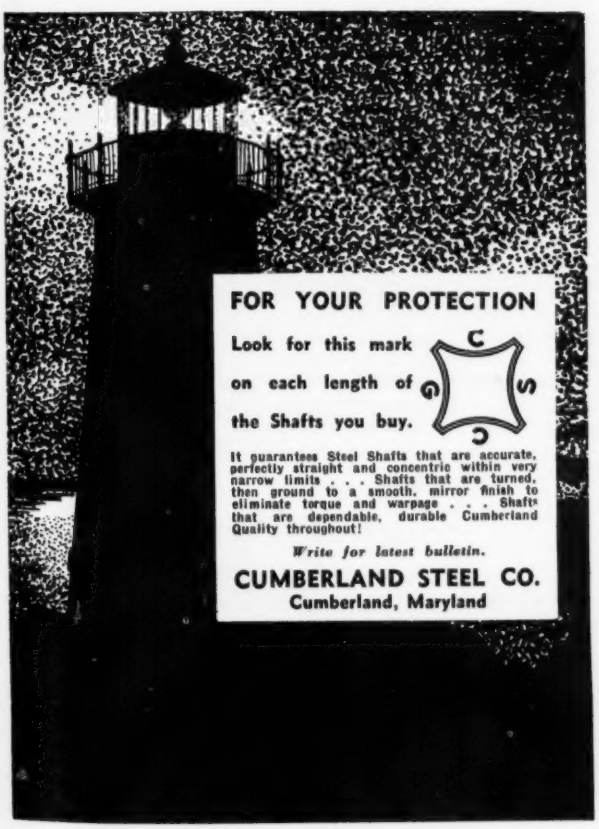

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Cumberland, Maryland

The Murray Collapsible Winder Shaft

Ask OUR ENGINEERS *to help* SOLVE YOUR *Problems*

Paper Mill Equipment

Flat Pulp Screens — Paper Machine Drives
Winder Shafts — Refiners-Hydrators
Cylinder Moulds — Gate Hoists
Deckers — Grid Unit Heaters
Roll Heading Machines

Pulp Mill Equipment

Agitators — Rotary Incinerators
Flat Screens — Disc Evaporators
Deckers — Recovery Systems
Sulphur Burners — Grid Unit Heaters

Wood Room Equipment

Slashers — Chippers
Barking Drums — Chip Screens
Wood Cleaner — Chip Crushers

Equipment must keep in step with the modern advancement of the paper industry. Our engineers are constantly working toward that end, and paper making problems are anticipated by them. Write for descriptive folder on any particular machine or the complete Murray line—or tell us your problem.

D. J. Murray Mfg. Co.

WAUSAU ~ WISCONSIN.

Co. Inc., *Black Hawk,* ———, 232 bls. rags, 392 bls. flax waste; ———, *Konigstein,* Antwerp, 225 bls. bagging; Philadelphia National Bank, *Konigstein,* Antwerp, 121 bls. bagging; ———, *Hokuroku Maru,* Shanghai, 200 bls. cotton waste; W. R. Grace & Co., *Hokuroku Maru,* Shanghai, 50 bls. cotton waste; ———, *Hokuroku Maru,* Osaka, 200 bls. cotton waste; C. Tennant Sons Co., *Kongo Maru,* Kobe, 100 bls. cotton waste; S. Shapiro & Sons, Inc., *Kongo Maru,* Kobe, 167 bls. cotton waste; E. J. Keller Co. Inc., *Sonnavind,* ———, 134 bls. paper stock.

BONE GLUE

———, *Hansa,* Hamburg, 320 bags.

OLD ROPE

W. Steck & Co., *Black Heron,* Antwerp, 34 coils; Chase National Bank, *American Banker,* London, 46 coils.

CASEIN

———, *Collamer,* Bordeaux, 133 bags; Balfour Guthrie & Co., *American Legion,* Buenos Ayres, 666 bags; ———, *American Legion,* Buenos Ayres, 872 bags; G. H. Hammond Co., *American Legion,* Buenos Ayres, 334 bags; ———, *Hansa,* Hamburg, 70 bags.

WOOD PULP

———, *Kolsnaren,* Stockholm, 600 bls. sulphite; Gottesman & Co. Inc., *Kolsnaren,* Stockholm, 450 bls. sulphite; Castle & Overton, Inc., *Kolsnaren,* Viipuri, 1,974 bls. wood pulp; Lagerloef Trading Co., *Kolsnaren,* Viipuri, 4,680 bls. sulphite; Lagerloef Trading Co., *Kolsnaren,* Viipuri, 156 bls. sulphate; Bank of N. Y. Trust Co., *Consul Corfitzon,* Hernosand, 3,000 bls. sulphate, 508 tons; Gottesman & Co. Inc., *Consul Corfitzon,* Hernosand, 2,400 bls. kraft pulp, 406 tons; E. M. Sergeant Pulp & Chemical Co., *Consul Corfitzon,* Hernosand, 600 bls. sulphite, 100 tons; Central Hanover Bank Trust Co., *Consul Corfitzon,* Hernosand, 600 bls. sulphite, 100 tons; Pagel Horton & Co. Inc., *Consul Corfitzon,* Sikea, 150 bls. sulphite; Pagel Horton & Co. Inc., *Consul Corfitzon,* Hornefors, 150 bls. sulphite; Gottesman & Co. Inc., *Consul Corfitzon,* Iggesund, 1,375 bls. sulphite; Bulkley Dunton & Co., *Consul Corfitzon,* ———, 500 bls. sulphate, 100 tons; Perkins Goodwin & Co., *Belos,* Sundsvall, 450 bls. sulphite, 75 tons; Perkins Goodwin & Co., *Belos,* Sundsvall, 2,100 bls. sulphate, 350 tons; Pagel Horton & Co. Inc., *Belos,* Gefle, 1,665 bls. sulphate, 328 tons; Pagel Horton & Co. Inc., *Belos,* Gefle, 625 bls. sulphite, 125 tons; Gottesman & Co. Inc., *Belos,* Gefle, 1,200 bls. sulphite, 121 tons; Gottesman & Co. Inc., *Belos,* Ronneby, 3,446 bls. dry pulp, 585 tons; Stora Kopparberg Corp., *Belos,* Skutskar, 1,060 bls. dry pulp, 211 tons; ———, *Ida,* Trieste, 1,190 bls. wood pulp; Price & Pierce, Ltd., *Stavangerfjord,* Oslo, 100 bls. sulphite; J. Andersen & Co., *Stavangerfjord,* Oslo, 1,835 bls. sulphate; The Borregaard Co. Inc., *Stavangerfjord,* Sarpsborg, 1,008 bls. sulphate; Irving Trust Co., *Stavangerfjord,* Oslo, 500 bls. chemical pulp; N. Y. Trust Co., *Hansa,* Hamburg, 318 bls. wood pulp, 49 tons.

WOOD PULP BOARDS

———, *Kolsnaren,* Viipuri, 411 rolls; Jay Madden Corp., *Kolsnaren,* Viipuri, 16 bls; Jay Madden Corp., *Kolsnaren,* Kotka, 109 rolls; Jay Madden Corp., *Pr. Roosevelt,* Hamburg, 108 rolls.

NEWARK IMPORTS

WEEK ENDING OCTOBER 24, 1936

H. G. Craig Co., *Newscarrier,* Donnacona, 341 rolls newsprint.

ALBANY IMPORTS

WEEK ENDING OCTOBER 24, 1936

Pagel Horton & Co. Inc., *Consul Corfitzon,* Sikea, 2,400 bls. sulphite; Pagel Horton & Co. Inc., *Consul Corfitzon,* Hornefors, 3,000 bls. sulphite; Bulkley Dunton & Co., *Consul Corfitzon,* ———, 9,625 bls. sulphite, 1,625 tons; Perkins Goodwin & Co., *Belos,* Sundsvall, 600 bls. sulphite, 100 tons; Perkins Goodwin & Co., *Belos,* Sundsvall, 3,000 bls. sulphate, 500 tons; ———, *Belos,* Sundsvall, 321 bdls. wall board; Pagel Horton & Co. Inc., *Belos,* Gefle, 7,325 bls. sulphite, 1,050 tons; Pagel Horton & Co. Inc., *Belos,* Gefle, 1,550 bls. sulphate, 404 tons; Bulkley Dunton & Co., *Belos,* ———, 1,625 bls. sulphite, 330 tons; Price & Pierce, Ltd., *Belos,* Gefle, 900 bls. sulphite 150 tons; Stora Kopparberg Corp., *Belos,* Skutskar, 500 bls. dry pulp, 99 tons.

PHILADELPHIA IMPORTS

WEEK ENDING OCTOBER 24, 1936

Lagerloef Trading Co., *Kolsnaren,* Viipuri, 129 bls. sulphite; Castle & Overton, Inc., *Kolsnaren,* Viipuri, 2,212 bls. wood pulp; Jay Madden Corp., *Kolsnaren,* Kotka, 195 rolls newsprint; Philadelphia Inquirier, *Kolsnaren* Norrkoping, 496 rolls newsprint; Guaranty Trust Co., *Kolsnaren,* Norrkoping, 43 bls., 783 rolls kraft paper; ———, *Ida,* Trieste, 200 bags hide glue; ———, *Ida,* Trieste, 1,014 bls. wood pulp; E. J. Keller Co. Inc., *Black Heron,* ———, 478 bls. rags; The Lang Co., *Black Heron,* Antwerp, 483 bls. rags; R. Blank, *Black Heron,* Antwerp, 80 bls. rags; Lachman Mills, Inc., *Black Heron,* Antwerp, 23 bls. jute waste; ———, *Waukegan,* Hamburg, 212 bls. rags, 127 bls. paper stock; ———, *Waukegan,* Hamburg, 54 rolls wrapping paper; Darmstadt Scott & Courtney, *Waukegan,* Hamburg, 52 bls. paper stock; Castle & Overton, Inc., *Collamer,* St. Nazaire, 50 bls. rags; F. Weber & Co., *Collamer,* Havre, 2 cs. drawing paper; Loumar Textile By Products Co., *Collamer,* Havre, 206 bls. rags; Castle & Overton, Inc., *Collamer,* Havre, 48 bls. new cuttings, 249 bls. rags; Castle & Overton, Inc., *Collamer,* Bordeaux, 783 bls. rags; E. J. Keller Co. Inc., *Collamer,* ———, 644 bls. rags; Bulkley Dunton & Co., *Simon von Utrecht,* ———, 750 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING OCTOBER 24, 1936

Congoleum Nairn Co., *Black Heron,* Antwerp, 410 bls. rags; Congoleum Nairn Co., *Collamer,* Havre, 158 bls. rags; Congoleum Nairn Co., *Collamer,* Bordeaux, 335 bls. rags; Parsons & Whittemore, Inc., *City of Baltimore,* ———, 680 bls. wood pulp; Pagel Horton & Co. Inc., *Bockenheim,* Sweden, 9,000 bls. wood pulp; Bulkley Dunton & Co., *City of Newport News,* ———, 125 bls. wood pulp; Bulkley Dunton & Co., *Simon von Utrecht,* ———, 3,875 bls. wood pulp.

WILMINGTON IMPORTS

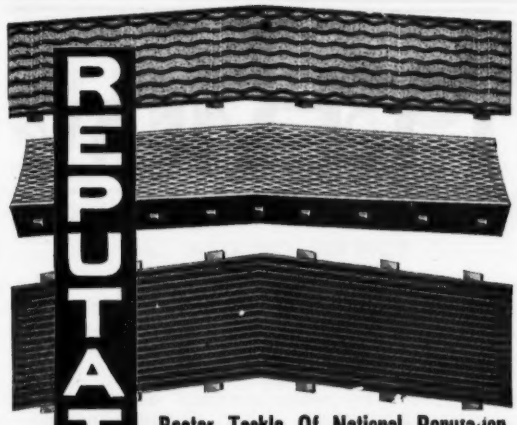
WEEK ENDING OCTOBER 24, 1936

Pagel Horton & Co. Inc., *Bockenheim,* Sweden, 1,500 bls. wood pulp.

MONTREAL IMPORTS

WEEK ENDING OCTOBER 24, 1936

Pagel Horton & Co. Inc., *Topdalsfjord,* Sweden, 8,375 bls. wood pulp; Pagel Horton & Co. Inc., *Nanking,* Sweden, 19,253 bls. wood pulp.



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SULPHUR — CHIPS — HOGGED FUEL
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RECOGNIZE THE VALUE OF
KNOWING EXACTLY
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You will say the

New Williams Precision Freeness Tester

is the most accurate and easiest one to operate you have ever seen

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Automatic timing by means of telechron clock eliminates personal element in making tests

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Readings uniformly consistent from slowest stock to freest

Measures Freeness on same principle as stock loses its water on paper machine

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HERALD BLDG. WATERTOWN, N. Y.

"Half-Mile-Ray"
PORTABLE EMERGENCY SEARCHLIGHTS

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BREAK-DOWNS
INSPECTIONS
WATCHMEN
FIRES
POWER FAILURES

A dependable, powerful light that will penetrate smoke and steam and give daylight working conditions for night repairs and emergencies.

Also corrosion resisting Floodlights
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CITY ..... STATE .....

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, October 28, 1936.

Conditions in the local paper market are satisfactory. Demand for the various standard grades of fine paper is well sustained. The movement into consumption is heavy. Sales forces of the leading paper organizations are optimistic regarding the future trend. Prices are holding to formerly quoted levels, in most instances.

The position of the newsprint paper market is improving. According to *Printer's Ink*, newspaper advertising for September showed more than a normal gain. The rise over the corresponding period of the preceding year amounted to 15.1 per cent. For the first nine months of 1936 the increase over last year was 9.4 per cent.

Sentiment in the fine paper market is optimistic. Demand for book, cover, bond and ledger papers is persistent. Prices are holding to schedule. Tissues are moving freely. The coarse paper market is displaying strength. Specialties are in excellent request. The paper board market is sharing the general business improvement.

Mechanical Pulp

The ground wood pulp market is exhibiting a strong undertone. Production of mechanical pulp in the United States and Canada has been speeded to make up for time lost during the long drought of last summer. Recently advance quotations on ground wood pulp are being maintained and the outlook for the industry is promising.

Chemical Pulp

Steadiness prevails in the chemical pulp market. All the various domestic and imported grades are very firm. Bleached sulphite pulp and kraft pulp continue strong. More paper mill interest is being shown in the bleachable grades of unbleached sulphite pulp, despite recently advanced quotations, which are being maintained.

Old Rope and Bagging

The old rope market is firmer. Demand for foreign and domestic old manila rope is better, while small mixed rope is fairly active. Old rope prices are steady. The bagging market is moderately active. Scrap and gunny bagging are going forward in fairly good volume. Roofing bagging is attracting more interest than of late.

Rags

Trading in the domestic rag market is becoming more lively. Demand for new and old domestic rags is better. There are a number of inquiries around for new cotton cuttings, some of which should materialize into desirable orders. No. 1 white shirt cuttings are required for both domestic and foreign account. Roofing grades are strong.

Waste Paper

The paper stock market is showing signs of revival. Board mill demand for the lower grades is more active, with the result that quotations on strictly folded news and No. 1 mixed paper are firmer. The higher grades of waste paper are also displaying strength. Book stock is attracting more interest, and prices are slightly higher.

Twine

Influenced by the heavy seasonal demand for kraft wrapping paper the local twine market is exceptionally active. Demand for the various varieties is above the average experienced generally at this time of year. Supplies are moving into consumption freely. Prices are holding to formerly quoted levels.

Kalamazoo Superintendents Meet

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., Oct. 24, 1936.—The October meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents Association was held at the Park American Hotel here on Thursday evening October 22 at 7 P.M. It was a dinner meeting with about forty present including the officers.

Routine business was transacted after which chairman Otto F. Fischer introduced the speaker of the evening, Charles E. "Bud" Mueller of the Paper Makers Chemical Company. Mr. Mueller gave an instructive talk on "pitch," a subject on which he is an authority.

A partial list of those present follows:

Wm. H. Astle, C. A. Braginton, and R. L. Barton, Michigan Paper Company, Plainwell, Mich,; Norman J. Cowie and Arthur Cole, Rex Paper Company, Kalamazoo; S. V. Cothrell, American Analine and Dye Company; C. J. Christenson and M. S. Clark, Mathieson Alkali Works; L. H. Breyfogle, Draper Felts; W. P. Burleigh and Howard Mayshaw, Bird Machine Company; O. F. Fischer, Bryant Paper Company; M. F. Flotow, L. W. Richards and G. H. Rentrop, Westinghouse; Glen Sutton, and Al Sherwood, Sutherland Paper Company; W. H. Siewert and R. B. Stewart, Kalamazoo Vegetable Parchment Company; Homer Squires, the Felt man from Hamilton; H. E. Stafford, Hawthorne Paper Company; L. H. LaLiberte, Kalamazoo Vegetable Parchment Company; S. E. Mueller, and H. M. Eastman, Paper Makers Chemical Company; Mike Redmond, Kalamazoo Paper Company; Arnold Weller, J. A. Herman, and R. W. Holden, Stowe-Woodward Company; Paul de Gaucher, Michigan Paper Company and R. L. Zellers, French Paper Company, Niles, Mich.

SPENDING $50,000,000 IN SOUTH

(Continued from page 31)

the paper and pulp industry during the past year was the new mill of the Pulp Division of the Weyerhaeuser Timber Company at Everett, Wash., which is now in operation.

This plant, which cost approximately $3,500,000, has a daily capacity of 150 tons of unbleached sulphite pulp and is strategically situated with regard to timber supply and transportation facilities.

WHY NOT

REDUCE YOUR FOURDRINIER WIRE COSTS BY USING A WIRE THAT WILL GIVE YOU ALL AROUND SERVICE.

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A WIRE WITH A NON-CRACK PATENTED SELVIDGE

PURVES WIRES

ARE AS GOOD AS THE BEST.

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HOLYOKE, MASSACHUSETTS

REDUCE PRODUCTION COSTS

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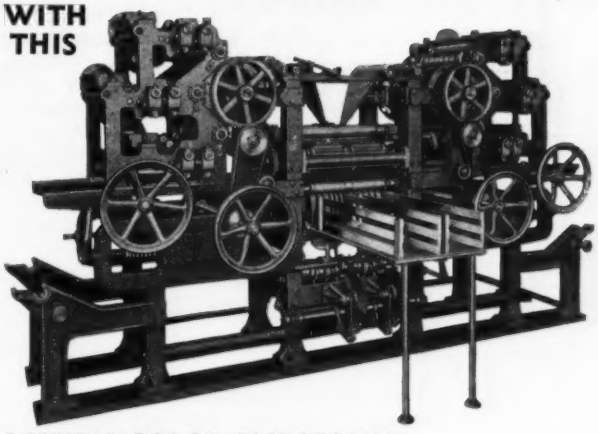

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Designed to meet demands for 3 color printed napkins . . . capacity 700 napkins printed in 3 colors, embossed and folded per minute . . . *printing units can be backed away quickly from tympan cylinder for quick make-ready* . . . napkin folder is our standard beltless type adjustable for making napkins 12" x 12" up to 14" x 14" or any intermediate size . . . separate counters if desired . . . shear cut knives with replaceable blades inserted. Our new folder describes this quarterfolder in detail. Write for it now.

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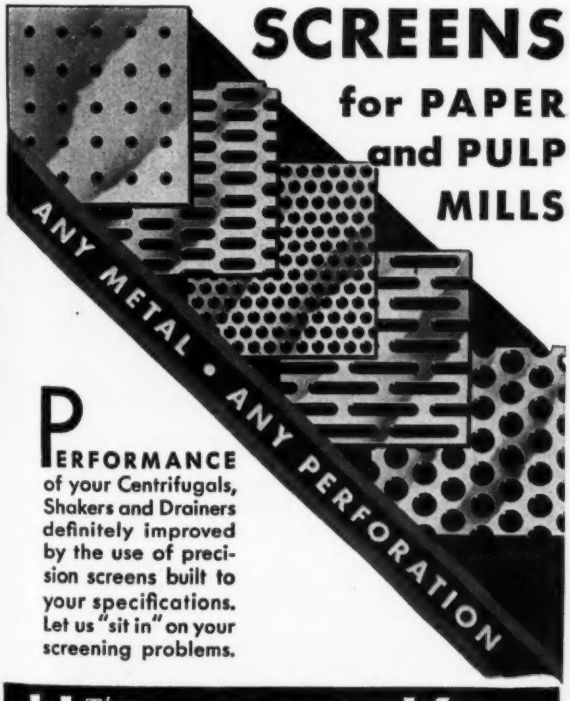
Manufacturers of paper converting machinery for all purposes.



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All kinds and styles of Felts for all kinds and styles of Papers.

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DRAPER BROS. COMPANY
CANTON, MASS.

Woolen manufacturers since 1856

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, October 28, 1936.

BLANC FIXE—The position of the blanc fixe market is practically unchanged. Prices are holding to schedule. The pulp is quoted at $42.50 to $45 per ton, in bulk; while the powder is selling at 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Conditions in the bleaching powder market are fairly satisfactory. Shipments against contract are moving with regularity. Prices are steady and unchanged. Bleaching powder is quoted at $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The casein market is fairly active. Domestic standard ground is quoted at 17 and finely ground at 17½ cents; while French and Argentine standard ground are selling at 17 and finely ground at 17½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA—Some improvements transpired in the caustic soda market. Contract shipments are moving freely. Prices are steady. Solid caustic soda is quoted at $2.55 to $2.60; while the flake and ground are selling at $2.95 to $3 100 pounds, in drums, at works.

CHINA CLAY—The china clay market is exhibiting a strong undertone. Demand from the paper mills is well sustained. Imported china clay is quoted at $12.50 to $21 per ton, ship side; while domestic paper making clay is selling at $6.50 to $12 per ton, ship side.

CHLORINE—Steadiness prevails in the chlorine market. The contract movement is well up to average. Inquiries for future needs are fairly numerous. Prices remain unchanged. Chlorine is quoted at $2.15 to $2.25 per 100 pounds, in tank cars, at works.

ROSIN—The rosin market is firm. Paper making gum rosin is now quoted at $6.17½ and wood rosin at $6.25 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $3.10 per 100 pounds, in tank cars, at works.

SALT CAKE—Paper mill demand for salt cake is brisk. Contract shipments are moving in good volume. Prices are firm Salt cake is quoted at $12 to $13; chrome salt cake at $11 to $12 per ton, at works; while imported salt cake is selling at $12 to $13 per ton, ship side.

SODA ASH—Business in the soda ash market is excellent. The contract movement is normal. Prices are steady to firm. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH—The starch market is moderately active. Contract shipments are moving freely. Prices remain steady and unchanged. Special paper making starch is quoted at $4 per 100 pounds, in bags; and at $4.27 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA—Demand for sulphate of alumina from the paper mills is insistent. Prices are holding to schedule, without difficulty. Commercial grades are quoted at $1.35 to $1.60; while iron free is selling at $2 to $2.25 per 100 pounds, in bags, at works.

SULPHUR—The sulphur market continues steady. Yearly contracts are quoted at $18 per ton, in bulk, on orders of 1,000 tons, or over, and $20 on smaller quantities. On spot and nearby car loads the quotation is $21 per ton. All quotations are in car lots, at works.

TALC—Trading in the talc market is moderately active. The movement of supplies into consumption is normal. Prices are steady. Domestic talc is quoted at $16 to $18 per ton, at eastern mines; while imported talc is selling at $23 to $30 per ton, on dock.

Market Quotations

Paper

Rag Content Bond & Ledgers—Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.50 @	8.50
No. 2 Sulphite	6.50 @	7.50
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

Book, B Grade, Cased		
S. & S. C.	5.85 @	6.60
S. & S. C. Litho	6.10 @	6.85
M. F.	5.60 @	6.35
No. 4 Grade		
Coated and Enamel	6.80 @	7.65
Coated Litho	6.80 @	7.65
Tissues—Per Ream—		
White No. 1	.82½ @	—
White No. 1 M. G.	.77½ @	—
White No. 1½	.62½ @	—
White No. 2	.60 @	—
Anti-Tarnish M. G.	.67½ @	—
Colored	.80 @	—
Kraft	.67½ @	—
Manila	.60 @	—
Unbleached Toilet	2.60 @	3.30
Bleached Toilet	3.94 @	5.26
Paper Towels—		
Unbleached	2.10 @	3.35
Bleached	3.30 @	3.70
Manila—		
No. 1 Jute	9.00 @	9.25
No. 2 Jute	7.75 @	8.50
No. 1 Wood	4.00 @	5.25
No. 2 Wood	3.50 @	4.00
Fibre Papers—		
No. 1 Fibre	4.25 @	5.50
No. 2 Fibre	4.00 @	4.75

(Delivered New York)

News, per ton—		
Roll, contract	41.00 @	—
Sheets	46.00 @	—
Kraft—		
No. 1 Northern	4.25 @	4.75
Standard	4.00 @	4.12½
Southern	3.87½ @	—
Glazed	4.37½ @	—
Striped	4.62½ @	—
Boards, per ton—		
News	37.50 @	40.00
Chip	35.00 @	37.50
Sgl. Mla. Ll. Chip	50.00 @	52.50
Jute Lined Chip	50.00 @	52.50
Kraft Liners	65.00 @	67.50
White Pat. Coated	60.00 @	62.50
Binders Boards	67.00 @	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—		
Moist	25.00 @	26.00
Dry	25.00 @	26.00

(Delivered)

No. 1 Domestic and Canadian	28.00 @	29.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—		
Division 1	2.70 @	3.30
Division 2	2.65 @	2.75
Division 3	2.60 @	2.70
Prime Qualities—		
Class 1. All Prime Easy Bleaching	2.20 @	2.25
Other Than Easy Bleaching—		
Class 2. Higher than Standard	2.10 @	2.20
Class 3 Standard	2.05 @	2.10
Class 4. Lower than Standard	1.95 @	2.00

(On Dock, Atlantic Ports)

Kraft Bleached	3.00 @	3.25
Kraft Light & Strong	2.10 @	2.20
Kraft No. 1	1.95 @	2.15
Kraft No. 2	1.85 @	1.90

(F. o. b. Pulp Mill)

Kraft Domestic	1.80 @	2.00

(Delivered)

Soda Bleached	2.60 @	—

* Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	7.75 @	8.00
Silesias No. 1	6.25 @	6.50
New Unbleached	6.25 @	6.50
New Soft Blacks	3.75 @	4.00
Blue Overall	6.75 @	7.00
Fancy	3.00 @	3.25
Washables	2.25 @	2.50
Mixed Khaki Cuttings	3.50 @	3.75
O. D. Khaki Cuttings	4.25 @	4.50

Old Rags

White, No. 1—		
Repacked	3.25 @	3.50
Miscellaneous	2.75 @	3.00
White, No. 2—		
Repacked	2.25 @	2.50
Miscellaneous	1.75 @	2.00
Thirds and Blues—		
Repacked	2.00 @	2.25
Miscellaneous	1.90 @	2.00
Roofing Rags—		
No. 1	Nominal	
No. 2	1.60 @	1.65
No. 3 (bagging)	1.50 @	1.55
No. 4	1.50 @	1.60
No. 5A	1.40 @	1.50

Foreign Rags

New Rags

New Dark Cuttings	2.25 @	2.50
New Mixed Cuttings	2.00 @	2.25
New Light Silesias	5.50 @	5.75
Light Flannelettes	5.50 @	5.75
New White Cuttings	7.00 @	7.50
New Light Oxfords	4.00 @	4.50
New Light Prints	3.00 @	3.25

Old Rags

No. 1 White Linens	7.50 @	8.00
No. 2 White Linens	6.50 @	7.00
No. 3 White Linens	4.50 @	5.00
No. 4 White Linens	2.25 @	2.50
No. 1 White Cotton	4.25 @	4.75
No. 2 White Cotton	3.25 @	3.75
No. 3 White Cotton	2.50 @	2.75
No. 4 White Cotton	1.90 @	2.15
Extra Light Prints	2.00 @	2.25
Ord. Light Prints	1.75 @	1.85
Med. Light Prints	1.55 @	1.65
Dutch Blue Cottons	2.25 @	2.50
French Blue Linens	3.50 @	4.00
German Blue Linens	2.50 @	2.75
German Blue Cottons	2.00 @	2.25
Checks and Blues	2.00 @	2.25
Linsey Garments	2.15 @	2.25
Dark Cottons	1.90 @	2.10
Old Shopperies	1.75 @	2.00
New Shopperies	1.75 @	2.00
French Blues	2.25 @	2.50

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	2.10 @	2.15
Domestic	1.75 @	1.85
Wool Tares, light	1.50 @	1.75
Wool Tares, heavy	1.85 @	2.05
Bright Bagging	1.70 @	1.75
Manila Rope—		
Foreign	2.75 @	3.00
Domestic	2.75 @	3.00
Jute Strings	2.00 @	2.25
Sisal Strings	2.00 @	2.10
Mixed Strings	.80 @	1.00

Old Waste Papers

(F. o. b. New York)

Shavings—		
White Envelope Cuttings	2.55 @	2.65
Ordinary Hard White No. 1	2.25 @	2.35
Hard White No. 2	2.10 @	2.20
Soft White No. 1	1.95 @	2.05
Flat Stock—		
Stitchless	.75 @	.80
Over issue Mag	.75 @	.80
Solid Flat Book	.70 @	.75
Crumpled No. 1	.50 @	.55
Ledger Stock	.85 @	.90
New B. B. Chips	.30 @	.35
Manilas—		
New Env. Cut	1.75 @	1.85
New Cuttings	1.35 @	1.45
Old Kraft Machine—		
Compressed bales	1.15 @	1.30
News—		
No. 1 White News	1.15 @	1.25
Strictly Overissue	.50 @	.60
Strictly Folded	.50 @	.55
No. 1 Mixed Paper	.40 @	.45

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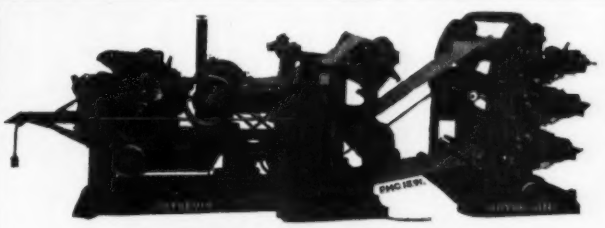

POTDEVIN
MODEL 102—HIGH SPEED
NOTION BAG MACHINE

Twines

(F. o. b. Mill)

(Soft Fibre)

Coarse Polished—			
India	.13¾	@	.16¼
Belg. White Hemp	.14¾	@	.18½
India Compress	.14¾	@	.14¾
Fine Polished—			
Fine India	.20	@	.22
Unpolished—			
Box	.09¾	@	.10¼
Paper Makers	.09½	@	.11¾
Tube Rope	.10½	@	.13¼
Wall Paper	.11½	@	.12¾
Wrapping	.15	@	.2
Soft Fiber Rope	.12¾	@	.13¼

(Hard Fibre)

Bond	.12	@	.20½
Anchor	.11½	@	.13
Manila	.21	@	.28

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.40
Water Marked Sulphite Bond	.06¾	@	.11
Sulphite Bond	.05½	@	.07¾
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¾
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¾
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	42.00	@	—
Sheets, open	47.00	@	—
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.60	@	.70
Solid Books	.50	@	.60
Blanks	1.00	@	1.05
Kraits	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45
Old Newspapers—			
No. 1 Folded News	.42½	@	.45
No. 1 Mixed Paper	.25	@	.30
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

Rag Content Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, M. F.	5.00	@	—
Book, S. S. & C.	5.25	@	—
Book, Coated	6.15	@	—
Coated Lithograph	6.15	@	—
No. 1 Jute Manila	10.50	@	—
Manila Sul., No. 1	6.75	@	—
Manila No. 2	4.25	@	—
No. 1 Kraft	6.00	@	—
Southern Kraft	5.00	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.08	@	.08½
New White, No. 2	.04½	@	.05
Light Silesias	.05½	@	—
Silesias, No. 1	.04½	@	.05
Black Silesias, soft	.03½	@	.04
New Unbleached	.06	@	—
Washable No. 1	.02	@	.02½
Blue Overall	.07	@	.07½
Cottons According to grades—			
Washable, No. 2	.02½	@	.04½
New Blue	.02	@	.02½
Fancy	.03	@	—
New Black Soft	.04	@	.04½
New Light Seconds	.03½	@	.04
New Dark Seconds	2.00	@	2.25
Khaki Cuttings—			
No. 1 O. D.	.04	@	.04½
No. 2 Mixed	.03½	@	.04
Corduroy	.02	@	.02¼
New Canvas	.04	@	.04½
New Black Mixed	.02	@	.02¼

Domestic Rags (Old)

White No. 1—			
Repacked	4.00	@	4.50
Miscellaneous	3.00	@	3.50
Thirds and Blues—			
Miscellaneous	2.00	@	2.25
Repacked	2.50	@	2.75
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	2.20	@	2.25
Domestic No. 1	1.50	@	1.60
Domestic No. 2	1.40	@	1.50
Roofing bagging	1.10	@	1.20

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	2.00	@	—
Domestic	2.25	@	—
Manila Rope	2.75	@	—
Sisal Rope	2.25	@	2.35
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	2.25	@	2.50
No. 2	1.00	@	1.10
Wool Tares, heavy	3.25	@	3.50
Mixed strings	1.00	@	1.10
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.50	@	2.75

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.40
No. 2 Hard White	2.10	@	2.20
No. 1 Soft White	1.80	@	1.85
No. 2 Soft White	1.40	@	1.45
No. 1 Mixed	—	@	.85
Solid Ledger Stock	1.50	@	1.60
Ledger Stock, white	1.15	@	1.20
Ledger Stock, colored	.85	@	.90
No. 1 Books, heavy	.65	@	.70
Manila Cuttings	1.80	@	1.90
Print Manila	.55	@	.60
Container Manila	.55	@	.60
Kraft Paper	1.10	@	1.20
No. 1 Mixed Paper	.45	@	.50
Straw Board Chip	.40	@	—
Binders Board Chip	.40	@	—
Corrugated Board	.60	@	.65
Overissue News	.60	@	—
Old Newspapers	.45	@	—

BOSTON

Paper

Rag Content Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
No. 1 Sulphite	7.50	8.50
No. 2 Sulphite	6.50	7.50
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06¼
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¼	@	—
No. 2 Kraft	.04¼	@	—
(Delivered New England points)			
Southern Kraft	.04	@	—
News Print Rolls	39.50	@	—
Straw Board, rolls	.009	@	35.00
Filled News Board	42.50	@	45.00
Chip Board	40.00	@	42.50
Single Manila Lined Chip	50.00	@	55.00
Single White, Patent Coated News Board (Bender)	60.00	@	65.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	67.00	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.20	@	2.35
No. 1 Soft White	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.50	@	1.75
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.60	@	.70
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.50	@	1.60
No. 1 Old Manila	.60	@	.65
White Blank News	1.10	@	1.15
No. 1 Kraft	1.20	@	—
Mixed Papers	.35	@	—
Print Manila	.55	@	.60
Container Manilas	.27½	@	—
Old Newspapers	.45	@	.47½
Overissue News	.50	@	—
Box Board Chips	—	@	.25
Corrugated Boxes	.47½	@	.50
Kraft corrugated boxes	.95	@	1.00
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.50	@	2.80
Domestic	2.75	@	—
Transmission Rope	1.25	@	1.35
Jute Rope	2.12½	@	2.25
Jute Carpet Threads	1.65	@	1.75
Gunny No. 1—			
Foreign	1.90	@	2.00
Domestic	1.75	@	1.80
Bleachery Burlap	4.25	@	4.50
Scrap Burlap—			
Foreign	1.90	@	2.00
Domestic	1.75	@	1.80
Scrap Sisal	2.00	@	2.10
Scrap Sisal for Shredding	2.10	@	2.35
Wool Tares, heavy	1.90	@	2.00
New Burlap Cuttings	2.25	@	2.50
Australian Wool Pouches	2.35	@	2.50
Heavy Baling Bagging	2.00	@	2.50
Paper Mill Bagging	1.65	@	1.70
Bagging No. 2	1.10	@	1.25

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.03½	@	.03¾
New White No. 1	.07½	@	.08
New White No. 2	.04½	@	.05
Silesias No. 1	.06½	@	.06¾
New Black Silesias	.03½	@	.04¼
Soft Unbleached	.08	@	.08½
Blue Chevoit	.06½	@	.07
Fancy	.03	@	.03¼
Washable	.02	@	.0250
Cottons According to grades—			
Blue Overalls	6.25	@	6.75
New Black, soft	—	@	—
Khaki Cuttings	.03¾	@	.04
O. D. Khaki	.03¾	@	.04¼
Corduroy	.02¼	@	.03
New Canvas	—	@	.05
B.V.D. Cuttings	.07¾	@	.08

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.60	@	1.70
No. 2	1.45	@	1.55
No. 3	1.35	@	1.45

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.85	@	2.00
New White Shirt Cuttings	6.50	@	6.75
Dutch Blues	2.25	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	2.00	@	2.10
Old Linsey Garments	2.00	@	2.37½
New Silesias	5.75	@	6.00

TORONTO

Paper

Bond—Delivered—			
No. 5 White	.10¾	@	—
No. 6 White	.10	@	—
No. 5 Tints	.11¾	@	—
No. 6 Tints	.10½	@	—
No. 5 Golden Rod	.12¾	@	—
No. 6 Golden Rod	.12	@	—
Ledgers—			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F.	6.50	@	6.75
No. 2 M. F.	6.25	@	6.50
No. 3 M. F.	5.00	@	5.35
No. 1 S. C.	7.00	@	7.50
No. 2 S. C.	6.50	@	7.00
No. 3 S. C.	5.50	@	6.00
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	4.80	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft, No. 2	5.40	@	—

(F. o. b. Cars Toronto)

News, per ton—			
Rolls (contract)	Nominal		
Sheets	Nominal		

Pulp

Ground wood	27.00	@	—
Unbleached Sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.25
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.80	@	.90
Light and Crumpled Book Stock	.70	@	.80
Leagers and Writings	.90	@	1.00
Manilas—			
New Manila Cut	1.25	@	1.40
Printed Manilas	.50	@	—
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.55	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.07¾	@	.08
Fancy Shirt Cuttings	.02¾	@	.03

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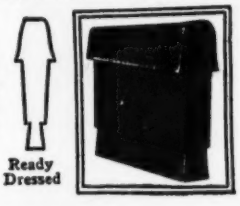

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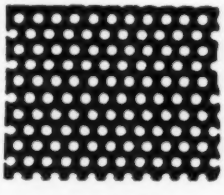
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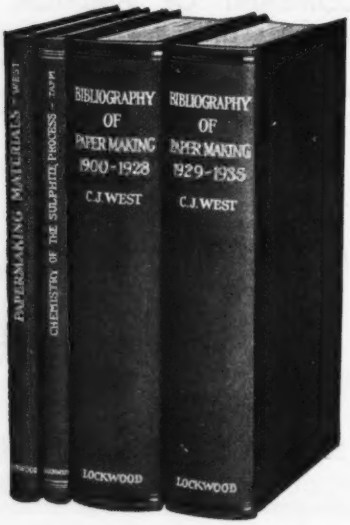
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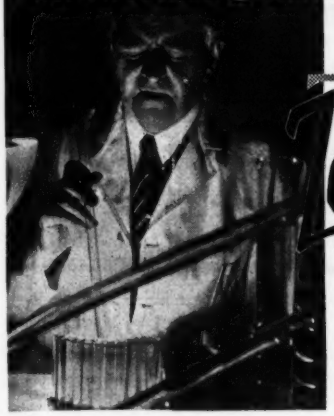

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SEALED PROPOSALS will be received until 10 a. m., November 23, 1936, in the room of the Joint Committee on Printing, in the Capitol, Washington, D. C., for furnishing the paper for the public printing and binding, and blank paper for the use of the Government departments and establishments in the District of Columbia, for the term of 6 months, beginning January 1, 1937, deliveries to be f. o. b. Washington, D. C. The proposals will be opened in the presence of and the award of contracts made by the Joint Committee on Printing to the lowest and best bidders for the interest of the Government whose bids are in conformity with the requirements of the proposal. The Committee reserves the right to reject any or all bids, or to accept any bid or any part and reject the other part, if, in its opinion, such action would be in the interest of the Government.

Blank proposals containing the instructions, schedule, and specifications, accompanied by standard samples, may be obtained by addressing A. E. Giegengack, Public Printer, Washington, D. C.

Contracts will be entered into for supplying the quantities required, whether more or less than the estimates, as provided in paragraph 15 of the proposal for paper.

The approximate estimated quantities set forth in detail in the schedule comprise:

1,500,000 pounds newsprint paper; 3,990,000 pounds machine-finish book paper; 100,000 pounds antique book paper; 80,000 pounds lightweight machine-finish book paper; 210,000 pounds 50% rag machine-finish book paper; 10,000 pounds 75% rag laid antique book paper; 25,000 pounds 100% rag machine-finish book paper; 950,000 pounds supercalendered book paper; 250,000 pounds halftone book paper; 650,000 pounds coated book paper; 10,000 pounds lithograph paper; 3,700,000 pounds mimeograph paper; 300,000 pounds U S M O safety writing paper; 8,000 pounds U S M O writing paper; 4,000 pounds safety writing paper; 5,282,500 pounds writing paper; 270,000 pounds map paper; 945,000 pounds manifold paper; 5,977,000 pounds bond paper; 784,000 pounds ledger paper; 933,000 pounds index paper; 2,500 pounds tissue paper; 240,000 pounds cover paper; 440,000 pounds manila paper; 756,000 pounds kraft paper; 1,000 pounds paraffin paper; 400,000 sheets gummed paper; 179,000 pounds blotting paper; 2,500 pounds stereotype molding paper; 20,000 pounds oiled manila tympan paper; 2,000 pounds plate-wiping paper; 2,000 pounds back-lining paper, for case making; 10,000 pounds high finish red sulphite; 140,000 pounds manila tag board; 860,000 pounds calendered tag board; 20,000 pounds manila cardboard; 53,000 sheets railroad board; 350,000 pounds bristol board; 6,000,000 pounds United States postal card bristol board; 32,000 sheets pressboard; 4,000 pounds news board; 1,000,000 pounds chip and strawboard; 15,000 pounds marble grained board; 36,000 pounds box board; 390,000 pounds binder's board.

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By direction of the Joint Committee on Printing.
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1—156″ Fourdrinier Machine
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1—112″ ″ ″
1—110″ ″ ″
1—108″ ″ ″
1—104″ ″ ″
1— 90″ ″ ″
2— 84″ ″
2— 80″ Harper Fourdrinier Machines
2— 62″ Fourdrinier Machines
1— 48″ ″ ″

Paper Machines, Cylinder

1—108″ seven cylinder machine
1—108″ single cylinder machine
1—104″ five cylinder machine
1—100″ single cylinder machine
1— 90″ single cylinder machine
1— 84″ five cylinder machine
1— 76″ four cylinder machine
1— 42″ three cylinder machine

Calender Stacks

1—156″ calender stack
1—118″ ″ ″
1—114″ ″ ″
1—108″ ″ ″
4— 84″ ″ ″
1— 72″ ″ ″
2— 72″ Super calenders
1— 72″ calendar stack
2— 68″ ″ ″
1— 54″ ″ ″
2— 48″ ″ ″

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1—1,000 KW. G. E.—3-phase, 60-cycle, 550-volt
1—Allis Chalmers with Kerr Turbine, 3-phase, 60-cycle, 550-volt
1—Curtis Turbine and G. E. Generator, 750 K.W. 3-phase, 60 cycle, 550-volt
1—18 x 42 Corliss
1—18 x 36 Corliss direct connected, 200-KW, 240-volt, D. C. generator

Generators and Engines—continued

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25—Variable Speed engines, all sizes
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2—10″ x 26″ Beloit Duplex Stuff Pump
2—8″ x 18″ Shartle Duplex Stuff Pumps
1—12″ x 20″ Shartle Triplex Stuff Pump
1—8″ x 18″ Black Clawson Duplex Stuff Pump
2—7″ x 16″ Shartle Duplex Stuff Pumps
2—12″ x 12″ Gould Triplex Stuff Pumps
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1—Scott 4-effect evaporator
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1—Modern heavy steel building, 104′ wide, 238′ feet long with two 2-ton cranes
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Fourdrinier Paper Machine, wire 114" x 65', two presses, 28 dryers 48 x 115", one calender, drive. New Cylinder Paper Machine, molds 36 x 91", four baby presses, one primary press. Three main presses. 32 dryers 48 x 88". Two calenders. Duplex cutter.

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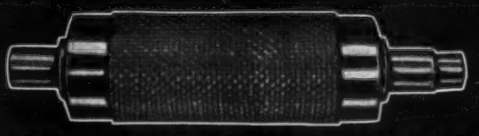
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Chase Brass & Copper Co.
Minneapolis-Honeywell Co.
D. J. Murray Mfg. Co.
Ross Engrg. Corp., J. O.
J. W. Singer
Thwing-Albert Instrument Co.

ALLOYS
Chase Brass & Copper Co.
Chromium Corporation of America
International Nickel Co.
Michigan Steel Castings Co.
Montague Machine Co.

ALUM
American Cyanamid & Chemical Corp.
du Pont de Nemours, E. I. & Co.
Paper Makers Chemical Corp.
Pennsylvania Salt Mfg. Co.

AMMONIA
American Cyanamid & Chemical Corp.
du Pont de Nemours, E. I. & Co.
Mathieson Alkali Works, Inc.
Pennsylvania Salt Co.

AMMONIA CONTROL APPARATUS
Wallace & Tiernan, Co., Inc.

ARCHITECTS AND ENGINEERS
Ferguson, Hardy S.
Hardy, George F.
Johnson & Wierk, Inc.

ARMORING, FLOOR
Hendrick Mfg. Co.

AUTOMATIC BEATER CONTROL
E. D. Jones & Sons Co.

BAG MACHINES
Potdevin Machine Co.
Smith & Winchester Mfg. Co.
Strachan & Henshaw, Ltd.
Weber, Herman G.

BAKELITE
The Richardson Co.

BARKERS
Allis Chalmers Mfg. Co.
Appleton Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Works Co.

BARKING DRUMS
Fibre Making Processes, Inc.

BEARINGS
Bantam Ball Bearing Co.
Hyatt Roller Bearing Co.
Improved Paper Mchy. Corp.
Link-Belt Co.
Montague Machine Works
SKF Industries
The Manhattan Rubr. Mfg. Co.
Timken Roller Bearing Co.
T. B. Wood's Sons Co.

BEARINGS, BALL (Angular Contact)
The Bantam Ball Bearing Co.
SKF Industries, Inc.
Timken Ball Bearing Co.

BEARINGS (Beater)
The Richardson Co.

BEARINGS, BALL (Radial and Thrust)
The Bantam Ball Bearing Co.
SKF Industries, Inc.

BEARINGS, BALL (Self-Aligning)
The Bantam Ball Bearing Co.
SKF Industries, Inc.

BEARINGS (Non-Metallic)
The Richardson Co.

BEARINGS (Oilless)
Manhattan Rubber Mfg. Co.
The Richardson Co.

BEARINGS, QUILL
The Bantam Ball Bearing Co.
Hyatt Roller Bearing Co.
SKF Industries, Inc.
Timken Ball Bearing Co.

BEARINGS, ROLLER (Self-Aligning)
The Bantam Ball Bearing Co.
Hyatt Roller Bearing Co.
SKF Industries
Timken Roller Bearing Co.

BEARINGS, ROLLER (Thrust)
The Bantam Ball Bearing Co.
Hyatt Roller Bearing Co.
SKF Industries, Inc.
Timken Roller Bearing Co.

BEARINGS, TABLE ROLLER
The Bantam Ball Bearing Co.
Hyatt Roller Bearing Co.
SKF Industries, Inc.
Timken Roller Bearing Co.

BEATERS
The Appleton Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Noble & Wood Machine Co.
Valley Iron Works Co.

BEATER BARS
Dilts Machine Works, Inc.
Improved Paper Mchy. Corp.
International Nickel Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Taylor Stiles & Co.
Valley Iron Works Co.

BEATER BARS (Bronze For)
Chase Brass & Copper Co.

BEATER HOODS
Dilts Machine Works, Inc.

BEATER ROLLS
Dilts Machine Works, Inc.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Valley Iron Wks.

BEATER STOCK RECORDERS
Bristol Co., The

BED PLATES
Bahr Bros.
Dilts Machine Wks., Inc.
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Taylor, Stiles & Co.
Valley Iron Wks.

BELTING (Conveyor, Transmission and V)
The Cincinnati Rubber Mfg. Co.
L. H. Gilmer Co.
Goodrich Rubber Co., B. F.
Goodyear Tire & Rubber Co.
The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
Rhoads Sons, J. E.

BLEACHING APPARATUS
E. D. Jones & Sons Co.
Perkins & Sons, Inc., B. F.
Moore & White Co.

BLEACHING POWDER
American Cyanamid & Chemical Corp.
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.
Pennsylvania Salt Co.

BLOCKS (Toe)
The Richardson Co.

BLEACHING PROCESS
Electro Bleaching Gas Co.
Pennsylvania Salt Co.

BLOW PIPES
Moore & White Co.
Murray Mfg. Co., D. J.

BLOW PITS
Kalamazoo Tank & Silo Co.
Murray, D. J. Mfg. Co.
Valley Iron Wks.
G. Woolford Wood Tank Mfg. Co.

BLOWERS (Centrifugal)
Chicago Electric Co.
De Laval Steam Turbine Co.
Roots - Connersville Blower Corp.
Ross Engineering Corp., J. O.

BOILER PRESERVATIVES
Magnus Chemical Co.

BOTTOMS (Steel & Wood)
Harrington & King Perforating Co.
Kalamazoo Tank & Silo Co.
Mundt & Sons, Charles

BRASS AND COPPER PRODUCTS (Rod, Wire, Sheet, Tube and Plates, Pipe, Water Tube)
Chase Brass & Copper Co.

BUCKETS (Elevating)
Hendrick Mfg. Co.
Link-Belt Co.

BUSHINGS
Improved Paper Mchry Co.
Manhattan Rubber Mfg. Co., Division of Raybestos-Manhattan, Inc.
Walworth Co.
Woods, T. B. Sons Co.

CADMIUM REDS
Chemical & Pigment Co.

CADMIUM YELLOWS
Chemical & Pigment Co.

CALENDERS
Beloit Iron Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Moore & White Co.
Norwood Engrg. Co.
Perkins & Son, Inc., B. F.
Smith & Winchester Mfg. Co
The Textile Finishing Machy. Co.
Valley Iron Works
Waldron Corp., John

CALENDER ROLLS
Appleton Machine Co.
Beloit Iron Wks.
Farrel-Birmingham Co .
Lobdell Car Wheel Co.
Norwood Engineering Co.
Perkins & Son, Inc., B. F.
The Textile Finishing Machy. Co.
Waldron Corp., John

CALIPERS (Micrometer)
Farrel-Birmingham Co.
Lobdell Car Wheel Co.

CAMERAS (Photomicrographic)
Bausch & Lomb Optical Co.
R. Fuess, Inc.

CARBON TETRACHLORIDE
Diamond Alkali Company

CASEIN
American Cyanamid & Chemical Corp.
Casein Co. of America
Paper Makers Chemical Corp.

CASTINGS (Alloy, Brass, Bronze, Iron)
Appleton Machine Co.
Beloit Iron Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
The Frederick Iron & Steel Co.
Hamblet Machine Co.
International Nickel Co.
Jeffrey Mfg. Co.
Link Belt Co.
Lobdell Car Wheel Co.
Michigan Steel Casting Co.
Montague Machine Co.
Smith & Winchester Mfg. Co.

CAUSTIC SODA
American Cyanamid & Chemical Corp.
Diamond Alkali Co.
Electro Bleaching Corp.
Johaneson, Wales & Sparre, Inc.
Mathieson Alkali Works, Inc.
Paper Makers Chemical Corp.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.

CEMENT (Acid Proof)
Pennsylvania Salt Mfg. Co.
Stebbins Engrg. & Mfg. Co.

CENTRIFUGAL MACHINERY
Bird Machine Co.
De Laval Steam Turbine Co.
Singer, J. E.
Williams Apparatus Co.

CHAIN DRIVES
Link-Belt Co.
Morse Chain Company

CHEMICAL FEED EQUIPMENT
Fibre Making Processes, Inc.
Wallace & Tiernan Co., Inc.

CHEMICALS
American Cyanamid & Chemical Corp.
Chemical & Pigment Co.
Diamond Alkali Company
E. I. du Pont de Nemours & Co., Inc.
Electro Bleaching Gas Co.
General Dyestuff Corp.
Geigy Co., Inc.
Gottesman & Co., Inc.
Johaneson, Wales & Sparre, Inc.
N. Y. Color & Chemical Co.
Paper Makers Chemical Corp.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.
Williams & Co., C. K.

CHIP CUTTERS
Fibre Making Processes, Inc.

CHIP DUSTERS
Fibre Making Processes, Inc.

CHIPPERS
Allis Chalmers Mfg. Co.
Appleton Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Works Co.

CHLORINATING APPARATUS
Stebbins Engrg. & Mfg. Co.

CHLORINE
Diamond Alkali Company
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.
Pennsylvania Salt Mfg. Co.

CHLORINE CONTROL APPARATUS
Wallace & Tiernan, Co., Inc.

CHROME PLATE
Chromium Corporation of America.

CHUCKS
Economy Chucks, Inc.
John Waldron Corp.

CLAY
American Cyanamid & Chemical Corp.
English China Clays Sales Corp.
International Pulp Co.
Paper Makers Importing Co.
Vanderbilt Co., R. T.

CLEANING MATERIALS
Bird Machine Co.
Magnus Chemical Co.
Philadelphia Quartz Co.

CLUTCHES
Allis Chalmers Mfg. Co.
Appleton Machine Co.
Beloit Iron Works
Farrel-Birmingham Co.
Link-Belt Co.
Moore & White Co.
D. J. Murray Mfg. Co.
T. B. Wood's Sons

COAL & ASH HANDLING MACHINERY
Link Belt Co.

COATING MACHINERY
Cameron Machine Co.
Moore & White Co.
Potdevin Machine Co.
Strachan & Henshaw, Ltd.
Waldron Corporation, John
Weber, Herman G.

COATING MATERIALS
Paper Makers Chemical Corp.
Stebbins Engrg. & Mfg. Co.

COCKS, Lubricated
Crane Co.
Walworth Co.

COGS
Bowsher, N. P., The

COLORIMETERS
Bausch & Lomb Optical Co.
Testing Machines, Inc.

COLOR ANALYZERS
Testing Machines, Inc.
Thwing-Albert Instrument Co.

COLOR MIXING EQUIPMENT
Waldron, John, Corp.

COMBINING MACHINE
Waldron, John, Corp.

COMPRESSORS
Allis-Chalmers Mfg. Co.
Chicago Electric Co.
Delaval Steam Turbine Co.
Oliver United Filters, Inc.
Roots-Connersville Blower Corp.
Worthington Pump & Machinery Corporation

CONDENSERS
Worthington Pump & Machinery Corporation

CONDENSER TUBES
Chase Brass & Copper Co.

CONTROLLING INSTRUMENTS
Bristol Co., The
The Brown Instrument Co.
R. Fuess, Inc.
General Electric Co.
Minneapolis-Honeywell Co.
Taylor Instrument Co.
Testing Machines, Inc.
Thwing-Albert Instrument Co.

CONVEYOR BELTS
The Cincinnati Rubber Mfg. Co.
Link Belt Co.

CONVEYOR CHAINS
Link-Belt Co.

CONVEYORS
Link-Belt Co.
Murray, D. J. Mfg. Co.
Ross Engineering Corp., J. O.

COOKING APPARATUS
E. D. Jones & Sons Co.

COOKING AND RECOVERY PROCESS
Chemipulp Process, Inc.
Fibre Making Processes, Inc.
Murray Mfg. Co., D. J.
Ross Engineering Corp., J. O.

COOLERS
Fibre Making Processes, Inc.
Ross, J. O. Mfg. Co.
Stebbins Engrg. & Mfg. Co.

COPPER WATER TUBE AND SWEAT FITTINGS
Chase Brass & Copper Co.

CORES (Paper)
Elixman Paper Co.

CORES (Steel)
The McNeil Machine & Engrg. Co.
Smith & Winchester Mfg. Co.

COUCH ROLLS
American Wringer Co.
Appleton Machine Co.
Beloit Iron Works
The Cincinnati Rubber Mfg. Co.
Downingtown Mfg. Co.
Goodrich Rubber Co., B. F.
Moore & White Co., The
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

WHERE TO BUY

Montague Machine Co.
D. J. Murray Mfg. Co.
Stowe-Woodward, Inc.
Valley Iron Wks.

COUPLINGS
Allis Chalmers Mfg. Co.
Beloit Iron Works
De Laval Steam Turbine Co.
Farrel-Birmingham Co., Inc.
The Frederick Iron & Steel Co.
Link Belt Co.
Moore & White Co.
Waldron Corp., John
Walworth Co.
T. B. Wood's Sons

CREPING MACHINES
Beloit Iron Works
Hudson Sharp Machine Co.
Paper Converting Machine Co., Inc.
John Waldron Corp.

CUTTERS
Beloit Iron Works
Downingtown Mfg. Co.
Seybold Machine Co.

CYLINDER MACHINES
Beloit Iron Wks.
Downingtown Mfg. Co.
Improved Paper Mchry. Co.
Moore & White Co.
Pusey & Jones Corp .
Valley Iron Wks.

CYLINDER WIRES
Appleton Wire Works
Castle & Overton
International Nickel Co.
International Wire Works
Lindsay Wire Weaving Co.
Purves Machine Wire Co., Inc.
Sinclair Co.

DAMPENERS
Perkins & Son, Inc., B. F.

DAMPER REGULATORS
The Brown Instrument Co.
Minneapolis-Honeywell Co.

DECKERS
Appleton Machine Co.
Bird Machine Company
Improved Paper Mchy. Corp.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Oliver United Filters, Inc.
Valley Iron Works

DECKLE STRAPS
Stowe-Woodward, Inc.

DEFOAMERS
National Oil Products Co.

DIE CUTTERS
Appleton Machine Co., The

DIES (Cutting and Creasing)
The Richardson Co.

DIESEL ENGINES
Worthington Pump & Machinery Corporation

DIFFUSER ROOM EQUIPMENT
Fibre Making Processes, Inc.

DIGESTERS
Pusey & Jones Corp.
Stebbins Engrg. & Mfg. Co.

DIGESTER FITTINGS
J. Murray Mfg. Co.

DIGESTER LININGS
Stebbins Engrg. & Mfg. Co.

DOCTORS
Beloit Iron Wks.
Bird Machine Company
Downingtown Mfg. Co.
Lobdell Carwheel Co.
Valley Iron Wks.

DOCTOR BLADES
The Cincinnati Rubber Mfg. Co.
Goodrich Rubber Co., B. F.
Improved Paper Mchy. Corp.
International Nickel Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
The Richardson Co.
Stowe-Woodward, Inc.

DOCTOR BLADES (Bronze For)
Chase Brass & Copper Co.

DRAINAGE SYSTEMS
Crane Company
Stickle Steam Specialties Co.

DRIERS
Allis Chalmers Mfg. Co.
Beloit Iron Wks.
Link Belt Co.
Ross, J. O. Engineering Corp.
Waldron, John, Corp.

DRIVE STANDS
Beloit Iron Works
Moore & White Co.

DRIVES
Beloit Iron Works
Bird Machine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
General Electric Co.
Link-Belt Co.
Moore & White Co.
Murray, D. J.
Pusey Jones Corp.
Valley Iron Wks.

DRYING SYSTEMS
Murray Mfg. Co., D. J.
Ross Engineering Corp., J. O.
Stickle Steam Specialties
Waldron Corporation, The

DUAL PRESS (Horizontal)
Bellot Iron Works

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Norwood Eng. Co.
D. J. Murray Mfg. Co.

DYESTUFFS & COLORS
E. I. du Pont de Nemours & Co.
Geigy Co., The
General Dyestuff Corp.
Heller & Merz
National Aniline & Chemical Co.
N. Y. Color & Chemical Co.
Paper Makers Chemical Co.
C. K. Williams & Co.

ELECTRIC EQUIPMENT
Allis-Chalmers Mfg. Co.
General Electric Co.

EMBOSSING MACHINES
Hudson Sharp Machine Co.
Paper Converting Machine Co.
John Waldron Corp.

EMBOSSING ROLLS
The Appleton Machine Co.
Hudson Sharp Machine Co.
B. F. Perkins & Son, Inc.
Roehlen Engraving Works, Inc.
The Textile Finishing Machy. Co.
Waldron Corporation, John

EVAPORATORS
Swenson Evaporator Co.
Traylor Engrg. & Mfg. Co.

EXTRACTORS
Bird Machine Company
Downingtown Manufacturing Co.
Valley Iron Works Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FAN CONTROLS (Ventilating)
The Brown Instrument Co.
Minneapolis-Honeywell Co.

FEEDERS
Traylor Engrg. & Mfg. Co.

FEED WATER HEATERS
Worthington Pump & Machinery Corporation

FELT CARRIER ROLLS
American Wringer Co.
Appleton Machine Co.
Beloit Iron Works
The Cincinnati Rubber Mfg. Co.
Downingtown Mfg. Co.
Goodrich Rubber Co., B. F.
Stowe-Woodward, Inc.
Valley Iron Wks.

FELT CLEANERS
Magnus Chemical Co.

FELT CONDITIONERS
Bird Machine Company

FELT CONDITIONER PLATE
The Richardson Co.

FELTS
Appleton Woolen Mills
Bulkley, Dunton & Co.
Draper Bros. Co.
Huyck & Son, E. C.
Knox Woolen Co.
Lockport Felt Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Turner, Halsey Co.
Waterbury Felt Co.

FELT GUIDES
Gilbert & Nash Co.
Moore & White Co.
John Waldron Corp.

FELT TIGHTENER (Automatic)
John Waldron Corp.

FELT WHIPPER BARS
The Richardson Co.

FILTERS
Improved Paper Mchy. Corp.
Moore & White Co.
Norwood Engrg. Co.
Oliver United Filters Inc.
J. O. Ross Engrg. Corp.
Stebbins Engrg. & Mfg. Co.
Swenson Evaporator Co.

FILTER CLEANERS
Magnus Chemical Co.

FILTER WIRES
Chase Brass & Copper Co.
International Nickel Co.

FITTINGS, Pipe (Plain end or flanged)
Crane Co.
Michigan Steel Castings Co.
Walworth Company

FLANGED FITTINGS
Chase Brass & Copper Co.
Crane Company
Walworth Company

FLEXIBLE COUPLINGS
Beloit Iron Works
De Laval Steam Turbine Co.
The Frederick Iron & Steel Co.
Link-Belt Co.
John Waldron Corp.
T. B. Wood's Sons

FLEXIBLE SLICE
E. D. Jones & Sons Co.

FLOORING
American Pressed Steel Co.
Goodrich, B. F. Rubber Co.
Hendrick Mfg. Co.
Norton Co.
Stebbins Engrg. & Mfg. Co.

FLOW METERS
Bristol Co., The
The Brown Instrument Co.
Minneapolis-Honeywell Co.

FLY BARS
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Jones & Sons Co., E. D.
Noble & Wood Machine Co.

FOLDING ENDURANCE TESTERS
Testing Machines, Inc.

FOLDING MACHINES
Hamblet Machine Co.
Hudson Sharp Machine Co.
Norwood Eng. Co.
Paper Converting Machine Co., Inc.
Waldron, John, Corp.

FORMING MACHINES
Downingtown Mfg. Co.

FOURDRINIER MACHINES
Beloit Iron Works
Downingtown Mfg. Co.
Moore & White Co.
Pusey & Jones
Smith & Winchester

FOURDRINIER WIRES
Appleton Wire Works
Castle & Overton
International Wire Works
Lindsay Wire Weaving Co.
Purves Machine Wire Co.
Sinclair Co.

FREENESS RECORDERS
Tolmbey Machine Works

FREENESS TESTERS
Testing Machines, Inc.

GALVANIZED IRON SHEETS
The American Rolling Mill Company

GALVANIZED STEEL SHEETS
The American Rolling Mill Company

GALVANIZED COPPER-BEARING STEEL SHEETS
The American Rolling Mill Company

GAS BURNER CONTROLS (Automatic Systems)
The Brown Instrument Co.
Minneapolis-Honeywell Co.

GAS ENGINES
Worthington Pump & Machinery Corporation

GEARS
Beloit Iron Works
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Improved Paper Mchy. Corp.
E. D. Jones & Sons Co.
Link-Belt Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Richardson Co.
Smith & Winchester Mfg. Co.
John Waldron Corp.

GEAR BLANKS
The Richardson Co.

GENERATORS
Allis Chalmers Mfg. Co.
Chicago Electric Co.
De Laval Steam Turbine Co.
General Electric Co.

GRANITE ROLLS
Beloit Iron Works
Downingtown Mfg. Co.
Perkins & Son, Inc., B. F.

GRAPPLES
J-B Engineering Sales Co.

GRATING (Sidewalk)
Hendrick Mfg. Co.

GRINDING WHEELS
Norton Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Seybold Machine Co.

GUMMED TAPE TESTERS
Thwing-Albert Instrument Co.

HAND CLEANERS
Magnus Chemical Co.

HANGERS
Crane Co.
Link Belt Co.
Walworth Co.
T. B. Wood's Sons Co.

HEATERS
Fibre Making Processes, Inc.
D. J. Murray Mfg. Co.
J. O. Ross Engrg. Corp.

HEATING AND VENTILATING SYSTEMS
Crane Co.
J. E. Singer
Ross Engineering Corp., J. O.
Stickle Steam Specialties Co.

HOISTS
Allis Chalmers Mfg. Co.
Appleton Machine Co.
General Electric Co.
E. D. Jones & Sons Co.
Link Belt Co.

HOSE (Air, Water, Suction, etc.)
The Cincinnati Rubber Mfg. Co.
Goodrich Rubber Co.
Goodyear Tire & Rubber Mfg. Co.
Manhattan Rubber Mfg. Co.

HOT ROLLED SHEETS
The American Rolling Mill Company

HYDRAULIC MACHINERY
Farrel-Birmingham Co.

INDICATORS
The Bristol Co.
The Brown Instrument Co.
General Electric Co.
Minneapolis-Honeywell Co.
Taylor Instrument Co.
Testing Machines, Inc.
Thwing-Albert Instrument Co.

INTERFOLDING MACHINES
Hudson Sharp Machine Co.
Paper Converting Machine Co., Inc.
John Waldron Corp.

INSTRUMENTS
Bowsher, N. P.
The Bristol Co.
The Brown Instrument Co.
R. Fuess, Inc.
General Electric Co.
Minneapolis-Honeywell Co.
Taylor Instrument Co.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

JORDANS
The Appleton Machine Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works

JORDAN FILLINGS
Appleton Machine Co.
Bahr Bros. Mfg. Co., The
International Nickel Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works

K MONEL
International Nickel Co.

KNIVES
Beloit Iron Wks.
Dilts Machine Works, Inc.
Hamblet Machine Co.
J. W. S. Trading Co., Inc.
Simonds Worden White
Taylor, Stiles & Co.
Valley Iron Wks.

LABELLING MACHINES
Potdevin Machine Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
Dilts Machine Wks.
Noble & Wood Machine Co.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Valley Iron Works
Williams Apparatus Co.

LATHES
Montague Machine Co.

LAY BOYS
Hamblet Machine Co.
Moore & White Co.

LEVELERS
National Oil Products Co.

LIME MUD FILTERS
Oliver United Filters, Inc.

LITHOPONE
Chemical & Pigment Co.
Krebs Pigment & Color Corp.
New Jersey Zinc Co.

LOFT DRYERS
Ross Engineering Corp., J. O.
John Waldron Corp.
Valley Iron Wks.

LUBRICANTS
Gulf Refining Co.
Standard Oil Co. of Indiana
Tidewater Oil Co.

MAGNIFIERS (Pocket)
Bausch & Lomb Optical Co.
R. Fuess, Inc.

MARKING BANDS (Rubber)
Stowe-Woodward, Inc.

WHERE TO BUY

METERS
The Bristol Co.
The Brown Instrument Co.
Minneapolis-Honeywell Co.
Roots Connersville Blower
Thwing Instrument Co.
Worthington Pump & Machinery Corporation

METERING & PROPORTIONING SYSTEMS
The Brown Instrument Co.
Minneapolis-Honeywell Co.
Trimbey Machine Works

MICROMETERS
Farrel-Birmingham Co.
Lobdell Carwheel Co.
Montague Machine Co.
Testing Machines, Inc.

MICRO-PROJECTORS
Bausch & Lomb Optical Co.

MICROSCOPES
Bausch & Lomb Optical Co.
R. Fuess, Inc.
Testing Machines, Inc.

MONEL METAL (Covered Rolls)
The International Nickel Co.

MONEL METAL (Rolled Forms)
The International Nickel Co.

MOTORS
Allis-Chalmers Mfg. Co.
Chicago Electric Co.
General Electric Co.

NAPKIN FOLDING MACHINE
Hudson Sharp Machine Co.
Paper Converting Machine Co., Inc.
Waldron, John, Corp.

NICKEL-CLAD STEEL
The International Nickel Co.

NICKEL IRON ALLOYS
The International Nickel Co.

NI-RESIST CAST IRON
The International Nickel Co.

OILLESS BEARINGS
The Richardson Co.

OLYMPIC BRONZE (Special)
Chase Brass & Copper Co.

OPACIFYING PIGMENT
Chemical & Pigment Co.
Krebs Pigment Co.
New Jersey Zinc Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.

PACKAGING MACHINES
Hudson Sharp Machine Co.

PACKING
Cincinnati Rubber Mfg. Co.
Goodrich, B. F. Rubber Co.
Goodyear Tire & Rubber Co.
Manhattan Rubber Co.
Rhoads, J. E. Sons
Stebbins Engrg. & Mfg. Co.

PACKAGING (Rubber)
B. F. Goodrich Rubber Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

PAPER BAG MACHINERY
Potdevin Machine Co.
Smith & Winchester Mfg. Co.
Strachan & Henshaw, Ltd.
Weber, Herman G.

PAPER BREAK RECORDERS
Thwing-Albert Instrument Co.

PAPER CUTTERS
Downingtown Mfg. Co.
Hamblet Machine Company
Moore & White Co.
Seybold Machine Co.
Smith & Winchester Mfg. Co.

PAPER MACHINE APRONS
Goodrich Rubber Co., B. F.

PAPER MACHINE DRIER CONTROL SYSTEMS
The Brown Instrument Co.
Minneapolis-Honeywell Co.

PAPER MANUFACTURERS
West Virginia Pulp & Paper Co.

PAPER MACHINE HOODS
Ross Engineering Corp., J. O.

PAPER MACHINE SLICES
Beloit Iron Works
Montague Machine Co.

PAPER ROLLS
B. F. Perkins & Son, Inc.
The Textile Finishing Machy. Co.
Waldron Corp., John

PAPER SCALES
Testing Machines, Inc.
Thwing-Albert Instrument Co.

PAPER TESTERS
R. Fuess, Inc.
Perkins & Son, Inc., B. F.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Valley Iron Works Co.
Williams Apparatus Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Langston Co., Samuel M.

PAPER WAXING MACHINERY
Potdevin Machine Co.
Waldron, Corp., John

PASTING MACHINES
Beloit Iron Works
Moore & White Co.
Murray, D. J., Mfg. Co.
Potdevin Machine Co.
John Waldron Corp.
Weber, Herman G.

PENESCOPE PENETRATION TESTER
Thwing-Albert Instrument Co.

PERFORATING MACHINES
Dietz Machine Works
Waldron John, Corp.

PERFORATED METAL
Chase Brass & Copper Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

pH CONTROL
Wallace & Tiernan, Co., Inc.

pH TESTERS
Wallace & Tiernan, Co., Inc.

PILLOW BLOCKS
Link Belt Company
T. B. Wood's Sons Co.

PIPE
Chase Brass & Copper Co.
The International Nickel Co.

PIPE (Spiral Welded)
The American Rolling Mill Co.

PIPE (Stainless)
Mundt & Sons, Charles

PIPE (Wood)
Wyckoff, A., & Son

PIPING
American Rolling Mill
Crane Co.
Goodrich, B. F. Rubber Co.
International Nickel Co.
Mundt & Sons, Charles
J. E. Singer
Walworth Co.

PLATES (Filter)
J. E. Singer
Stebbins Engrg. & Mfg. Co.

PLATES, IRON
The American Rolling Mill Company

PLATES, STEEL
The American Rolling Mill Company

PLATING, CHROMIUM
Chromium Corp. of America

PLATERS
Perkins & Son, Inc., B. F.

PLAYING CARD MACHINERY
Waldron, John, Corp.

PLUGS
E. D. Jones & Sons Co.

POWER TRANSMISSION EQUIPMENT
Allis Chalmers Mfg. Co.
Beloit Iron Works
De Laval Steam Turbine Co.
Farrel-Birmingham Co.
Link-Belt Co.
Moore & White Co.
Murray, D. J.
T. B. Wood's Sons

PRECISION INSTRUMENTS
The Bristol Co.
Brown Instrument Co.
R. Fuess, Inc.
Taylor Instrument Co.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

PRESSES
Farrel-Birmingham Co.
Fibre Making Processes, Inc.
The McNeil Machine & Engrg. Co.
Paper Converting Machine Co., Inc.
Potdevin Machine Co.
Valley Iron Wks.
Waldron Corp., John

PRESSES (Dual Suction)
Beloit Iron Works

PRESS ROLLS
American Wringer Co., Inc.
Beloit Iron Works
The Cincinnati Rubber Mfg. Co.
Downingtown Mfg. Co.
Goodrich Rubber Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
Pusey & Jones Corp
Stowe-Woodward, Inc.
Valley Iron Works Co.

PRESS ROLLS (Granite)
Beloit Iron Works
Perkins & Son, Inc., B. F.

PRESSURE BULKERS
B. F Perkins & Sons, Inc.

PRINTING PRESSES
Harris Seybold Potter Co.
Hudson Sharp Machine Co.
Potdevin Machine Co.
Paper Converting Machine Co., Inc.
Strachan & Henshaw, Ltd.
John Waldron Corp.
Weber, Herman G.

PULLEYS
Beloit Iron Wks.
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Link-Belt Co.
Montague Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Wks.
T. B. Wood's Sons

PULPSTONES
Norton Co.

PULPS
Andersen Co., J.
Castle & Overton
Gottesman & Co., Inc.
Johaneson, Wales & Sparre, Inc.
Lagerloef Trading Co.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.

PULPERS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.

PULP MACHINERY
Bird Machine Company
Fibre Making Processes, Inc.
D. J. Murray Mfg. Co.
Stebbins Engrg. & Mfg. Co.

PULP SCREENS
Bird Machine Company
Fibre Making Processes, Inc.
D. J. Murray Mfg. Co.
Trimbey Machine Works

PULP THICKENERS
Bird Machine Company
D. J. Murray Mfg. Co.
Downingtown Mfg. Co.
Moore & White Co.

PULP WASHERS
Oliver United Filters, Inc.

PULP WOOD MACHINERY
Montague Machine Co.

PULPWOOD STACKERS
Link Belt Co.

PUMP PRIMERS (Steam and Water Jet)
Valley Iron Works Co.

PUMP VALVE BALLS (Rubber)
Stowe-Woodward, Inc.

PUMPS
Allis-Chalmers Co.
Beloit Iron Works
Buffalo Pumps, Inc.
The Brown Instrument Co.
Chicago Electric Co.
Downingtown Mfg. Co.
Fibre Making Processes, Inc.
Frederick Iron and Steel Co.
De Laval Steam Turbine Co.
Minneapolis-Honeywell Co.
Moore & White Co.
Morris Machine Works
Nash Engineering Co.
Oliver United Filters Inc.
Roots - Connersville Blower Corp.
Smith & Winchester Mfg. Co.
Worthington Pump & Machinery Corporation
Valley Iron Works

PYROMETERS (Roll)
The Bristol Co.
The Brown Instrument Co.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Minneapolis-Honeywell Co.

RAG CUTTERS
Perkins & Son, Inc., B. F.
Taylor Stiles & Co.

REAM COUNTERS
Hamblet Machine Co.

REBUILT MOTORS
Chicago Electric Co.

RECORDING INSTRUMENTS
The Bristol Co.
The Brown Instrument Co.
General Electric Co.
Minneapolis-Honeywell Co.
Taylor Instrument Co.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Trimbey Machine Wks.

RECOVERY SYSTEMS
Fibre Making Processes, Inc.
D. J. Murray Mfg. Co.
Pusey & Jones
Ross Engineering Corp., J. O.
Stebbins Eng. & Mfg. Co.
Swenson Evaporator Co.

REELS
Beloit Iron Works
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hudson Sharp Machine Co.
Moore & White Co.

REFINERS
Appleton Machine Co.
Bahr Bros.
E. D. Jones & Sons Co.
Murray, D. J.
Noble & Wood Machine Co.
Valley Iron Wks.

REFRACTORIES
Norton Co.

REGULATORS
The Bristol Co.
The Brown Instrument Co.
General Electric Co.
Link Belt Company
Mason Neilan Regulator Co.
Minneapolis-Honeywell Co.
Taylor Instrument Co.
Trimbey Machine Works

ROD MILLS
Allis-Chalmers Co.
Mine & Smelter Supply Co.
Murray, D. J. Mfg. Co.
Traylor Engrg. & Mfg. Co.

ROLLS (Brass and Copper)
Chase Brass & Copper Co.

ROLLS (Chilled Iron & Gray Iron)
Farrel-Birmingham Co.
Improved Paper Mchy. Corp.
Lobdell Car Wheel Co.
Smith & Winchester Mfg. Co.
Valley Iron Works

ROLLS (Rubber or Rubber Covered)
American Wringer Co.
Beloit Iron Works
The Cincinnati Rubber Mfg. Co.
B. F. Goodrich Rubber Co.
D. J. Murray Mfg. Co.
Downingtown Mfg Co.
Improved Paper Mchy. Corp.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
Stowe-Woodward, Inc.

ROLL CHUCKS
Economy Chucks, Inc.

ROLL GRINDERS
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.

ROLL SLITTING MACHINES
Cameron Machine Co.
Langston Co., Samuel M.

ROLL STANDS
Cameron Machine Co.
Moore & White Co.

ROLL WINDING MACHINES
Cameron Machine Co.
Potdevin Machine Co.

ROOFING
J. E. Singer

ROPE DRIVES
Allis-Chalmers Mfg. Co.

ROTARY BLEACHING BOILERS
The McNeil Machine & Engrg. Co.

ROTARY COOLERS
Traylor Engrg. & Mfg. Co.

ROTARY DRYERS
Traylor Engrg. & Mfg. Co.

ROTARY KILNS
Traylor Engrg. & Mfg. Co.

RUBBER COVERING
Cincinnati Rubber Mfg. Co.
Manhattan Rubber Mfg. Co.
The Richardson Co.
Stowe Woodward, Inc.

RUBBER MOLDS
The McNeil Mch. & Engrg. Co.

SALT
Pennsylvania Salt Co.
Solvay Sales Co.

SALT CAKE
Gottesmorndt Co.
Johaneson, Wales & Sparre, Inc.

SATURATING MACHINES
Beloit Iron Wks.
Moore & White Co.
Potdevin Machine Co.
Waldron, John, Corp.
Weber, Herman G.

SAVEALLS
Bird Machine Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Moore & White Co.
Oliver United Filters, Inc.
The Richardson Co.

SCALES
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SCORE TESTERS
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SCREEN DIAPHRAGMS
The Cincinnati Rubber Mfg. Co.
Goodrich Rubber Co., B. F.
Manhattan Rubber Mfg. Co.

WHERE TO BUY

SCREENS
Appleton Wire Works
Beloit Iron Works
Bird Machine Company
Downingtown Mfg. Co.
Fibre Making Processes, Inc.
Harrington & King Perforating Co.
Hendrick Manufacturing Co.
International Wire Works
Improved Paper Mchy. Corp.
E. D. Jones & Sons Co.
Link-Belt Co.
Montague Machine Co.
Moore & White Co.
Charles Mundt & Sons
D. J. Murray Mfg. Co.
Valley Iron Works Co.

SCREEN PLATE
Bird Machine Company
D. J. Murray Mfg. Co.
Hendrick Mfg. Co.
Improved Paper Mchy. Corp.

SCRUBBERS
Traylor Engrg. & Mfg. Co.

SHAFTS
E. D. Jones & Sons Co.

SHAFTS, COLLAPSIBLE WINDOWS
Moore & White Co.

SHAFTS (Forged)
T. B. Wood's Sons
Moore & White

SHAKE SPRINGS
The Richardson Co.

SHEET MACHINE
Noble & Wood Machine Co.
Williams Apparatus Co.

SHEET METAL WORK
J. E. Singer

SHEAVES
Montague Machine Co.
T. B. Wood's Sons Co.

SHELLS
E. D. Jones & Sons Co.

SHOWER PIPES
Bird Machine Company
Downingtown Mfg. Co.
Montague Machine Co.
Moore & White Co.
Smith & Winchester Mfg. Co.

SHREDDERS (Pulp and Paper)
Taylor Stiles & Co.

SILICATE OF SODA
American Cyanamid & Chemical Corp.
Philadelphia Quartz Co.

SIZING
American Cyanamid & Chemical Co.
Bennett, Inc.
Paper Makers Chemical Corp.
National Oil Products

SIZING PROCESS
American Delthirna Corp.
Bennett, Inc.
National Oil Products Co.
Ross Engrg. Corp., J. O.

SLIME ELIMINATION
Wallace & Tiernan, Co., Inc.

SLIME REMOVER
Magnus Chemical Co.

SLITTERS AND REWINDERS
Beloit Iron Works
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Hamblett Machine Co.
Langston Co., Samuel M.
Moore & White Co.
Smith & Winchester Mfg. Co.
Strachan & Henshaw, Ltd.
Waldron Corporation, John

SLUICE BOARDS
The Richardson Co.

SODA ASH
American Cyanamid & Chemical Corp.
Diamond Alkali Company
Johaneson, Wales & Sparre Inc.
Mathieson Alkali Works, Inc.
Paper Makers Chemical Corp.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.

SOAP POWDER
Magnus Chemical Co.
Paper Makers Chemical Corp.

SODIUM METASILICATE
Philadelphia Quartz Co.

SODIUM SULPHATE
Johaneson, Wales & Sparre, Inc.

SODIUM SULPHIDE
Johaneson, Wales & Sparre, Inc.

SORTING TABLES
Moore & White Co.

SPECIAL MACHINERY
Askania Regulator Co.
D. J. Murray Mfg. Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Hamblet Machine Co.
Hudson Sharp Machine Co.
Montague Machine Co.
Paper Converting Machine Co., Inc.
Potdevin Machine Co.
John Waldron Corp.

SPECIAL PIPE FITTINGS
The American Rolling Mill Company

SPEED REDUCERS
Beloit Iron Works
De Laval Steam Turbine Co.
Farrel-Birmingham Co.
Link-Belt Co.
Moore & White Co.

SPIRAL WELDED PIPE
The American Rolling Mill Company

SPROCKETS
Improved Paper Mchy. Corp.
Link Belt Co.

STAINLESS STEEL SHEETS STRIP PLATES
The American Rolling Mill Company
The American Rolling Mill Company
The American Rolling Mill Company

STAIR and FLOOR TILES—(Non-Slip)
Norton Company

STAIR TREADS
Hendrick Mfg. Co.
Norton Company

STARCH
American Cyanamid & Chemical Corp.
Clinton Co.

STEAM SPECIALTIES
Crane Co.
Stickle Steam Specialties Co.

STEEL (Electric Furnace Open Hearth)
Timken Roller Bearing Co.
Timken Roller Bearing Co.

STEEL PLATE CONSTRUCTION
Hendrick Mfg. Co.
Link-Belt Co.
Ross Engrg. Corp., J. O.

STOCK CUTTERS
Perkins & Son, Inc., B. F.

STOKERS—Screw or Plunger Type
The Frederick Iron & Steel Co.
Link Belt Co.
Swenson Evaporator Co.

STOCK REGULATORS
Trimbey Machine Co.

STRAW MAKING MACHINERY
Samuel H. Langston Co.

STUFF CHESTS
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Jones & Sons Co., E. D.
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Valley Iron Works Co.
G. Woolford Wood Tank Mfg. Co.

STUFF PUMPS
Beloit Iron Works
Buffalo Pumps, Inc.
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
The Frederick Iron & Steel Co
Moore & White Co.
Noble & Wood Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

SUCTION BOXES
Downingtown Mfg. Co.
Trimbey Machine Co.

SUCTION BOX COVERS
Beloit Iron Wks.
Gilbert & Nash
E. D. Jones & Sons Co.
Moore & White Co.
The Richardson Co.

SUCTION ROLLS
American Wringer Co.
Beloit Iron Works
Downingtown Mfg. Co.

SULPHUR
American Cyanamid & Chemical Corp.
Texas Gulf Sulphur Co.

SULPHUR BURNERS
Chemi. Pulp Process
Valley Iron Wks.

SUPER CALENDERS
Beloit Iron Works
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Moore & White Co.
Norwood Engrg. Co.
Perkins & Son, Inc., B. F.
Smith & Winchester Mfg. Co.
The Textile Finishing Machy. Co.

TABLE ROLLS
American Wringer Co.
Beloit Iron Works
The Cincinnati Rubber Mfg. Co.
Goodrich Rubber Co., B. F.
Manhattan Rubber Mfg. Co.
Stowe-Woodward, Inc.

TACHOMETERS
The Brown Instrument Co.
The Bristol Co.
Minneapolis-Honeywell Co.
Testing Machines, Inc.

TANKS
Hendrick Mfg. Co.
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Manhattan Rubber Mfg.
J. O. Ross Engrg. Corp.
Stebbins Engrg. & Mfg. Co.
Traylor Engrg. & Mfg. Co.
G. Woolford Wood Tank Mfg. Co.

TEAR TESTERS
Testing Machines, Inc.
Thwing-Albert Instrument Co.

TELETYPE MACHINES
American Tel. & Tel. Co.

TEMPERATURE RECORDERS
The Bristol Co.
R. Fuess, Inc.
Taylor Instrument Co.
Testing Machines, Inc
Thwing-Albert Instrument Co.

TENSILE TESTERS
Perkins & Son, Inc., B. F.
Testing Machines, Inc.
Thwing-Albert Instrument Co.

TESTERS (Bursting Strength)
Testing Machines, Inc.
Perkins & Son, Inc., B. F.

TESTERS (pH)
Thwing-Albert Instrument Co.
Wallace & Tiernan, Co., Inc.
Wilkens Anderson Co.

TESTERS (Smoothness)
R. Fuess, Inc.
Williams Apparatus Co.

TESTERS (Stiffness)
R. Fuess, Inc.
Testing Instruments, Inc.
Thwing-Albert Instrument Co.

TESTING INSTRUMENTS (Thickness Test)
Testing Instruments, Inc.

TESTING INSTRUMENTS (Basis Weights)
R. Fuess, Inc.
Testing Instruments, Inc.
Thwing-Albert Instrument Co.

TESTING LABORATORY
E. I. du Pont de Nemours & Co., Inc.

THICKENERS
Bird Machine Company
Dorr Co.
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Moore & White
D. J. Murray Mfg. Co.
Oliver United Filters, Inc.

TITANIUM PIGMENT
Chemical & Pigment Co.
Krebs Pigment & Color Corp.
Titanium Pigment Co.
R. T. Vanderbilt Co.

TIE RODS
International Nickel Co.

TOILET FOLDING MACHINES
Hudson Sharp Machine Co.
Paper Converting Machine Co., Inc.

TOILET WINDERS
Cameron Machine Co.
Dietz Machine Works
Hudson Sharp Machine Co.

TOWEL FOLDING MACHINES
Paper Converting Machine Co., Inc.
Waldron Corp., John

TOWEL INTERFOLDING MACHINES
Dietz Machine Works
Hudson Sharp Machine Co.

TOWEL WINDER
Cameron Machine Co.
Hudson Sharp Machine Co.
Waldron Corp., John

TOWERS
Cameron Machine Co.
Hudson Sharp Machine Co.
Stebbins Engrg. & Mfg. Co.
Waldron Corp., John

TRANSMISSION MACHINERY
Beloit Iron Works
De Laval Steam Turbine Co.
Farrel-Birmingham Co.
Link-Belt Co.
Timken Roller-Bearing Co.
T. B. Wood's Sons

TRAPS (Steam)
Crane Co.

TRUCKS
Moore & White Co.

TUBES (Paper)
Elixman Paper Core Co.

TUBING
Chase Brass & Copper Co.
The International Nickel Co.
The Richardson Co.
Timken Roller Bearing Co.

TUBS (Wood)
De Laval Steam Turbine Co.
G. Woolford Wood Tank Mfg. Co.

TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Roots - Connersville Blower Corp.

TURBO-GENERATORS
Allis-Chalmers Mfg. Co.
Chicago Electric Co.
De Laval Steam Turbine Co.

USED EQUIPMENT
Chicago Electric Co.

VACUUM CONTROL
A. E. Broughton Co.

VALVE DISCS
The Richardson Co.

VALVES
The Brown Instrument Co.
Cooper Alloy Foundry Co.
Crane Co.
E. D. Jones & Sons Co.
D. J. Murray Mfg. Co.
Minneapolis-Honeywell Co.
Ross Engineering Corp.
Trimbey Machine Works
Walworth Co.

VENTILATING SYSTEMS
J. O. Ross Engrg. Corp.

WASHERS
Bird Machine Company
Downingtown Mfg. Co.
Fibre Making Processes, Inc.
Improved Paper Mchy. Corp.
E. D. Jones & Sons Co.
Moore & White Co.
Oliver United Filters Inc.
Swenson Evaporator Co.
Traylor Engrg. & Mfg. Co.

WAXING MACHINERY
Potdevin Machine Co.
Waldron, John, Corp
Strachan & Henshaw, Ltd.
Weber, Herman G.

WAX SIZE
American Cyanamid & Chemical Corp.
Bennett, Inc.
National Oil Products Co.
Paper Makers Chemical Corp.

WET MACHINES
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Montague Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co

WINDERS & REWINDERS
Beloit Iron Works
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Langston Co., Samuel M.
Moore & White Co.
Potdevin Machine Co.
Smith & Winchester Mfg. Co.
The Textile Finishing Machy. Co.
John Waldron Corp.

WIRES
Appleton Wire Works
Improved Paper Mchy. Corp.
International Wire Works
Lindsay Wire Weaving Co.
Purves Machine Wire Co., Inc.

WIRE CLEANERS
Magnus Chemical Co.

WIRE CLOTH
International Nickel Co.
Oliver United Filters, Inc.

WIRE GUIDES
Gilbert & Nash Co.
Moore & White Co.
John Waldron Corp.

WIRE GUIDE ROLLS
American Wringer Co.
Goodrich Rubber Co., B. F.
Stowe-Woodward, Inc.

WIRE STRETCH ROLLS
American Wringer Co.
Stowe-Woodward, Inc.
Valley Iron Works Co.

WOOD SPLITTERS
D. J. Murray Mfg. Co.
Moore & White Co.

WOOD TANKS
G. Woolford Wood Tank Mfg.

WORMED CUTTERS
American Wringer Co.
The Cincinnati Rubber Mfg. Co.
Stowe-Woodward, Inc.

WRENCHES
Walworth Co.

ZINC DUST
New Jersey Zinc Co.

ZINC OXIDE PIGMENT
New Jersey Zinc Co.

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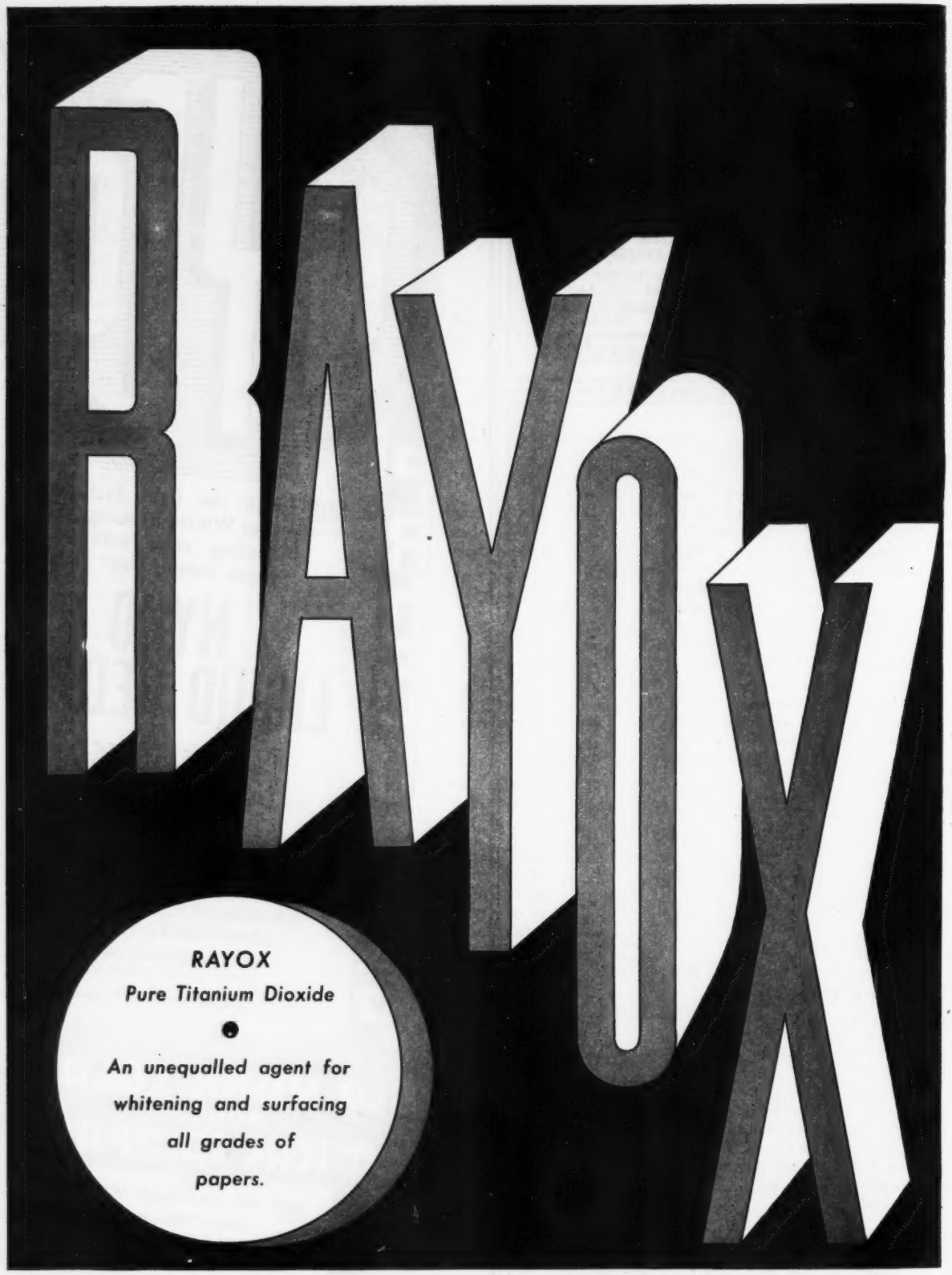

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